MINING WORLD

ANNUAL CATALOG ISSUE DEVELOPMENT AND DIRECTORY NUMBER

1954

TO EACH HIS OWN in pumping abrasives

If you want

maximum head

and ability to work in series

HYDROSEAL

Because Hydroseals maintain their initial efficiency up to the point when Maximix Rubber replacements are needed, oversize pump and motor allowance for wear is never required. Thus, power costs are cut 1/3 to 1/2.

Write for Hydroseal Catalog No. 953.

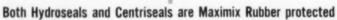
If you must pump

WITHOUT gland water

CENTRISEAL

Industrially efficient in moving abrasives, corrosives, and acids where pulp must be delivered undiluted or sealing water is unavailable. Mechanical parts are interchangeable with anti-friction bearing Hydroseals.

Write for Centriseal Brochure No. 853





THE ALLEN-SHERMAN-HOFF PUMP CO.

Dept. J-259 E. Lancaster Ave., Wynnewood, Pa.

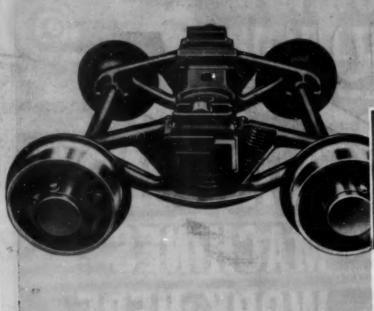
Representatives throughout the World

HYDROSEAL

and CENTRISEAL

SAND, SLURRY & DREDGE PUMPS

AXIMIX RUBBER PROTECTED



The NC-1 Truck climaxes 20 years of intensive research, providing (through the friction control mechanism shown in cutaway) protection to equipment, roadbed and lading with maximum wear life.



Willison Automatic Couplers save time with maximum safety...can be coupled at either end of car or locomotive...require no manual assistance. Close coupling eliminates damaging slack, permits high speeds with maximum stability.

products cut per ton costs!

Latest example of National's pioneering in better equipment is the NC-1 Truck. Its sweeping advancements over conventional trucks include long soft springs, a friction mechanism—controlling vertical and transverse oscillations, a cast one-piece bolster with large lubricated center connection, and automatic frame alignment. The NC-1 has been designed with the same factor of safety that is required by the Association of American Railroads for full size railroad trucks, and embodies the same features which A.A.R. tests have shown to be essential to produce good riding qualities. For the best in profitable equipment, always specify National products.



National M-230 Rubber-Cushioned Draft Gear for cars operating through rotary dump. Soft initial-action, high-capacity rubber pads provide maximum impact protection, lengthen equipment life. Available in a range of capacities and design variations to fit individual requirements.



M-225 Rubber-Cushioned Draft Gear for locomotives and large capacity cars not required to operate through rotary dump. Maximum protection in minimum space.

A-1848

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Villioon Automotic Couplers . Friction & Rubber Draft Goars . Car Trucks . NACO Steel Wheels . NACO S

Products
FOR TRANSPORTATION
AND INNOCEDED
SINGS SIA 1666

NOW 45 MARION MACHINES WORK HERE

MARION POWER SHOVEL CO.

Additional 151-M shovels bring the total of MARION machines at this giant copper mine to 45. The 7 cubic yard 151-M is winning new friends in mining, quarrying, heavy construction and coal. Ask for Bulletin 393-A2.

MARION, OHIO % TO 45 CU. YDS.

Including the Export Edition

WORLD MINING



Published monthly except in April

when publication is semi-monthly

Vol. 16

WORLD MINING LOVERSEASI SECTION

APRIL 15, 1954

No. 5

Catalog Issue, Development and Directory Number

Index of Editorial Content

MOKED WILLING (OAEKSEYS) SECTION		EUROPE			
An Accounting of the Mineral Industry for 1953-		Austria	H2 B2	Netherlands	86
The state of the s	0.0	Cyprus	82	Portugal	86
by V. L. Mattson	. 29	Finland	83	Spain	88
Metals and Minerals Review		France	83	Sweden	88
Aluminum, by Keen Johnson	. 32	Greece	84	United Kingdom	88
Antimony, by James P. Bradley	. 32	East (Soviet) Germany	85	Western Germany Yugoslavia	89
Beryllium, by D. H. Hershberger		Italy Luxembourg	85	Indestants	
Chrome, by Fay L. Bristol	. 33	Paremponta	90		
Cobalt, by C. R. Whittemore	. 84	LATIN AMERICA			
Copper, by W. W. Lynch		Argentina	74	French Guiana	76
Fluorspar, by C. O. Anderson		Bolivia	74	Guatamala	78
Gold, by George O. Argall, Jr. Iron, by Marvin A. Hustad		Brazil	74	Honduras	78
Lead, by C. E. Schwab		British Gniana	74	Mexico	78
Magnesium, by James S. Kirkpatrick		Columbia	75	Nicaragua	78
Manganese, by F. A. McGonigle		Costa Rica	75	Peru	78
Mercury, by J. Eldon Gilbert	. 40	Ecuador	76	Surinam	80
Molybdenum, by C. M. Loeb, Jr		El Salvador	76	venezuela	2167
Nickel, by A. E. Roberts		NORTH AMERICA			
Oil Shale, by Boyd Guthrie		Canada	71	Cube	73
Perlite, by E. P. Chapman Jr. and John A. Wood		Jamaica	71	Cana	
Phosphate, by G. Donald Emigh		James			
Silver, by Henry L. Day		OCEANIA			
Sulphur, by John C. Carrington		Australia	106	New Zealand	107
Tin, by Robert J. Nekervis		Fiii		Taiwan (Free China)	
Titanium, by P. W. Allen		Indonesia		Philippine Islands	
Tungsten, by Worthen Bradley		New Caledonia	107		
Uranium, by William J. Waylett		140.00.10	MODIE	FEATURES	
Zine, by Otto Herres	48	MINING	MOKIL) FEATURES	
WORLD WIDE MINING REPORT		UNITED STATES MINING I	¥ 1953		
AFRICA		Alaska	49	Montana	59
	911	Arizona	50	Nevada	
Algeria		California		New Mexico	
French Morocco 92 Sierra Lenne		Central States		Oregon	68
Gold Coast 93 South West Africa		Colorado		South Dakota	63
French Equatorial Africa 93 Southern Rhodesia		Eastern States	54	Washington	65
French West Africa 94 Swaziland		Idaho District		Wroming	
Kenya 96 Tanganyika		Lake Superior District	38	m. Jonning	-
Liberia 96 Tunisia		UNITED STATES MINING A	GENCIE	5	
Madagasear 95 Uganda				ministration	115
Nigeria 97 Union of South Africa	103	Coneral Services Administ	ration		117
Northern modests, 98		United States Atomic Ener	gy Come	minsion	113
ASIA		United States Bureau of L	and Man	agement	114
Burma 109 Jordon	111	United States Bureau of	Mines		116
Ceylon 109 Malaya		United States Geological S	urvey	***************	117
Hong Kong 109 Republic of Korea		UNITED STATES ORE BUYE	RS GUII	DE	120
India 110 Thailand		DIRECTORY OF U. S. MINI	ING CO	MBANIES	125
Israel 110 Turkey					
Japan 110		INDEX OF MANUFACTURE			305

EDITORIAL AND EXECUTIVE OFFICES

San Francisco 5, Calif.

GArfield 1-5887

General Manager, San Francis

Editor GEORGE O. ARGALL. JR.
Field Editor A. E. ROBERTS
Field Editor MARVIR HUSTAD
Field Editor STANLEY DAYTON Field Editor STARLEY DAYLUN News Editor J. M. TAYLOR Assistant News Editor G. J. WOLFE District Manager, Chicago KAREL WEGKAMP District Manager, New York H. L. WALDRON PROduction Manager J. A. CHEESMAN Assoc. Editor, Vancouver CHARLES L. SHAW

Branch Offices

Branch Offices

New York 17 370 Lex. Ave., Murray Hill 3-9295
Chicage 26 , 1791 Howard, Ropert Park 4-3420
Les Angeles 17, Calif. ... 815 S. Witner St.
Unike 9-1112
Vancouver 3, B.C., 402 Pender Street West
Marine 7287
American Trade Journals, Inc.
Millor Freeman, Prasident
L. K. Smith, Vise-President
M. B. Freeman, Vise-President
Miller Freeman, Jr., See-Treas.

A MILLER FREEMAN PUBLICATION



Copyright 1954 by American Trada Journals Inc.

Contents may not be reproduced without permission

WORLD MINING is published the 26th of each month as a regular department of MINING WORLD and is also circulated as a separate publication on a carefully controlled free basis to a selected list of management and supervisory personnal associated with active mining enterprises throughout the world.

Staff Correspondents

Staff Correspondents

Africa: Acera, Guld Coast; Contermanaville, Belgian Congo; Johannesburg, Union of Seuth Africa; and Kitwe, Northern Bhodesia. Asla: Ankara, Turker; Benares, India; Stala: Lumpor, Federated Malay States; and Tokyo, Japan. Europe: Frankfert W.est Germaney; Helsinki, Finland; Lendon, England; Modrid, Spaln; Faris, France; Redruth, Cornwell; Rome, Italy: Stockholm, Sweden; The Hague, Netherlandt; and Trendheim, Norway, Marth and Central America: Munico City, Mexico; San Jose, Costa Sica; and Vancouver, British Columbia. Beassis; Port Kembla, (R.S. W.) Australia. Boath America: Bernal, Argentina; La Par, Bellicis; Lima, Peru; Gulto, Ecuador; and Sao Paulo, Brazil.

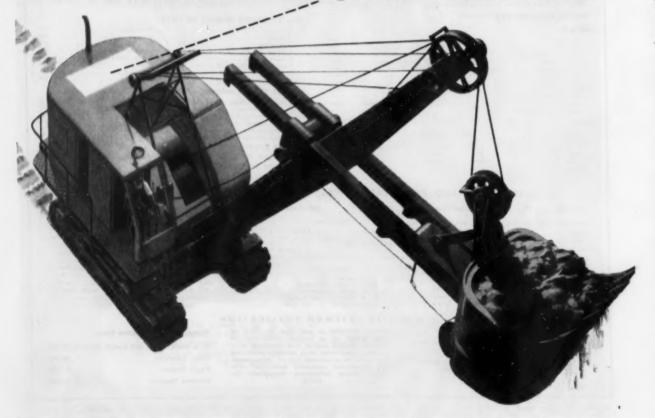
Mining World Subscription Rates

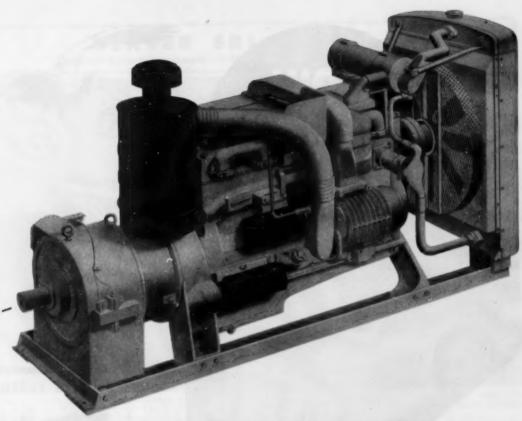
U. S. I	North, 1	los	th	1	94	١d	1	C	91	mé	rei	ı	A	ST	11	F	İq	0	\$1	1.0
Other	Countri	03			,														\$4	6.0
Single	Copies															,	,		\$.3
Directo	er Nue	ale.																		

MINING WORLD, April 15, 1954. Volume 16, No. 5. Published monthly, except April when publication is semi-monthly, at Emmett St., Bristol, Conn. Executive, advertising and editorial offices, 121 Second St., San Francisco 5, California. Subscription in United States, North, Central and South America, 33.00 per year: other countries, \$4.00 per year: the countries, \$4.00 per year the post Office at Bristol, Conn., under the act of March 3, 1879. Postmaster: please send notice 3579 to MiNING WORLD, 121 Second St., San Francisco 5, Calif.

Cummins Diesel - torque converter package speeds work cycle as much as 30%

Gives full utilization of horsepower, minimizes shock





loads, adds to life of shovels, cranes, and draglines

Cummins Torque Converter Packages give smooth steady power over the entire digging or working cycle. Even where digging is the toughest and power requirements fluctuate widely, the Cummins Torque Converter maintains power without lugging, stalling or overspeeding. Crane work, too, can be speeded because loads can be handled more smoothly and accurately.

The output of the Cummins Torque Converter Package is measured by an output shaft governor which determines the exact amount of power required each instant and automatically matches engine speed to load requirements. This increases work capacity, adds to equipment life, saves fuel and engine wear.

Cummins Diesels, ranging from 60 to 600 h.p., equipped with one of many types of torque converters, can match any job you have. Available as replacement units or in many makes of new equipment.

Cummins Engine Company, Inc. Columbus, Indiana

Rugged diesel power (60-600 h.p.)

SAN FRANCISCO Watson & Meehan

s: FRESNO; REDDING. Authorized Sales & Service: STOCKTON—Connell Truck Company; SACRAMENTO—Frank J. Coyle; EUREKA—Frad E. Barnett; —Neveda Tronsit Company.

LOS ANGELES **Cummins Service & Sales**

Branch, BAKERSFIELD. Authorized Soles & Service; BISHOP—tnya Diesel Service; INDIO—Crow Motor Company; BLYTHE—Leo's Diesel Service, COLTON—Smith's Diesel Soles; EL CENTRO—Ryne's Automotive Service; SAN LUIS OBISPO—See Luis Truck Service; SAN DIEGO—F. R. Loux Diesel Service; SANTA MARIA—Hanson Equipment Co.; BAKER—Newton Automotive Service.

Cummins & Moran

Authorized Sales & Service:
YUMA—Cooper Tractor Service; LAS VEGAS—Stirling Diesel Service.

SALT LAKE CITY

Cummins Intermountain Diesel Sales Co.

Authorized Sales & Service: CEDAR CITY—Wally's Chevron Truck Service; IDAHO FALLS—Automotive Body and Machine, Inc.



PACIFIC

U.S.A. AND FOREIGN PATENTS APPLIED FOR ON ALL PACIFIC "SLUSHMASTER" SCRAPERS

Newest member of the growing family of PACIFIC "Slushmaster" Scrapers is our new Model AB-48. Weight 951 lbs. Width 48". Cap. 20 cu. ft. 15-25 H.P. required

All ten PACIFIC "Slushmaster" Scrapers are high-capacity, low-horsepower models which have proved their "dig-ability" and "scrape-ability". Their acceptance by mining companies in all parts of the world is due to their design superiority. Write today for new Bulletins No. 253 and 254.

BE SPECIFIC - ORDER PACIFIC

For added efficiency, use Pacific Sheave Blocks, Sheave Anchors, "Round-the-Corner" Sheave Blocks, Jaw Crushers, Bit Knockers and Pacific Wearing Parts. Write for Bulletins.

ALLOY STEEL & METALS CO.

1848 East 55th St., Los Angeles 58, Calif.

(Mailing address: Box 15323 Vernon Station, Los Angeles 58, Calif.)

OUTSTANDING FEATURES



- A. Designed to ride its loads. Saves horsepower. Low center of gravity. Practically impossible to turn over. Doesn't fish-tail.
- B. Inter-locked components are designed to eliminate shear on bolts.
- **c.** Optional side cutters. Your choice of straight or flared.
- Variable application of inhaul pull is provided by multiple positions of shackle on front support.

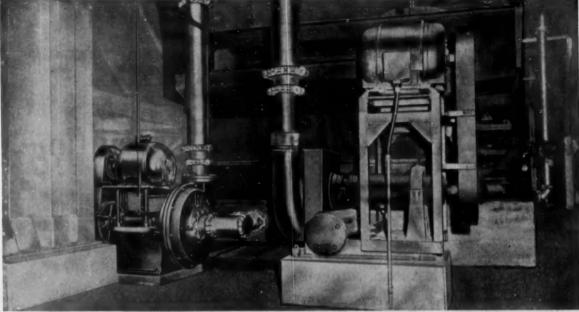
TEN SIZES TO SUIT YOUR REQUIREMENTS

	MODEL	SIZE	WEIGHT
	(2A	26"	398#
See	2A	30"	485#
Bulletin) 2A	34"	515#
	AB	36"	744#
No. 253	AB	42"	812#
	· (AB*	48"	951#
See	(28	36"	1280#
	28	42"	1395#
Bulletin	28	48"	1520#
No. 254	(2C	60"	2360#

New size added

DENVER SRL PUMPS

Complete Milling Equipment-from testing, to feeder, to dryer!



This is a graphic illustration of the efficiency and comparative size of Denver SRL Sand Pumps. The 6"x6", 15 h.p. Denver SRL Sand Pump on the left replaced a 6" sand

pump (on the right), now used for standby, only. The Denver SRL Pump handles 2,000 tons of classifier overflow per 24 hours, at 45% solids.

Long Service By Denver SRL Sand Pumps Means Less Maintenance Time, More Profits

Long service life and low maintenance on Denver SRL Sand Pumps mean maximum, continuous production and more profits. One to four years of continuous service, with original parts, on —1/8" pulp or below is common with these Denver pumps. This long, profitable service is possible because the rubber lining in Denver SRL Sand Pumps resists abrasion, cuts, tears and blisters.

SPECIALLY BONDED RUBBER LINING

Rubber linings and runners of the Denver SRL Pumps are specially bonded to steel skeletons by an exclusive pressure molding process. This process prevents the resilient, wear-resistant rubber from pulling away from the skeleton forms. You thus have wearing parts with up to 50 times longer life than parts of hardest alloy iron. The high resilience of the rubber is important. Passage of tramp up to 3" without stalling the pump has been reported. Rubber can even be punctured without efficiency loss.

HIGH EFFICIENCY, LOW HORSEPOWER

Pressure molding on all parts is extremely accurate so you get maximum efficiency. Efficiency is as high as 70%, which is 1½ to 3 times the efficiency possible with cast parts of ordinary iron or steel. Generally the Denver SRL Sand Pump requires less than one-half the brake horsepower required by other sand pumps in similar service.

SIMPLE CONSTRUCTION

There are less than 25 main parts in this pump. Operation and maintenance are easy. Rubber casings and runners are quickly changed so standby pumps are unnecessary. The pump requires very little sealing water.

Write or wire today. Find out how you can increase your profits and get more economical, efficient, longer, continuous service with a Denver SRL Sand Pump—sizes 2"x2" to 10"x8", capacities up to 2,500 g.p.m. @ 60% solids, stock deliveries subject to prior sale.

Free Technical Bulletin Sent on Request



Over 25 years of Flotation Engineering

DENVER EQUIPMENT COMPANY

1400 SEVENTEENTH ST.

DENVER 17, COLORADO

CATALOG, DEVELOPMENT AND DIRECTORY NUMBER, 1954

[World Mining Section-7]



DEPENDABLE DOW FLOTATION AGENTS

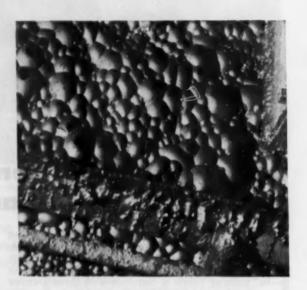
bring you top pay load every time

DOW XANTHATES, superior collectors, and DOWFROTH 250, economical frother, make a powerful team for improving your flotation of sulfide minerals

Dow XANTHATES bring mineral recovery up and costs down in any mill operation. Every bubble is loaded to capacity with the desired mineral—a wide range of Xanthates makes a choice of selectivity possible: Z*-3, Potassium Ethyl Xanthate, is a low-cost reagent—popular as an all-purpose collector for many years. Z-11, Sodium Isopropyl Xanthate, also a general-purpose Xanthate, is lower in cost and higher in collecting power than the ethyls. For this reason it is becoming more and more popular with operators for flotation and differential separation of substantially

a powerful collector for almost all sulfide minerals, particularly for tarnished and oxidized minerals—also for oxide lead minerals after sulfidization. Other Xanthates are also available for special problems.

all sulfide minerals. Z-6, Potassium Amyl Xanthate, is



DOWFROTH® 250 is an economical frother—producing improved metallurgy in many mills today, with as little as one-fourth consumption of previous frothers used. This translates into increased profits and substantial savings in all types of froth flotation operations.

Dowfroth produces a livelier froth on the machine, quicker breaking in the launders and pump boxes. Prove its efficiency—and its economy—in your own mill.

Send for test samples of Dowfroth 250 and Xanthates to Dept. OC 837J, THE DOW CHEMICAL COMPANY, Midland, Michigan.

you can depend on DOW CHEMICALS



Stops Blinding

Increases Capacity — Cuts Screening Costs

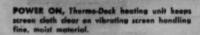


You can screen fine, moist material continuously with a Thermo-Deck heating unit. No down time required to clear fine or medium mesh screen cloth!

Heated screen cloth remains open . . . you get more tonnage through the screen and better separation.

Operating records prove that heated wire cloth screens last up to three times longer than non-heated cloth, because they do not have to be pounded free of blinded material. For the same reason, you save man-hours too. These lower costs increase your profits.

The Thermo-Deck unit can be applied to Allis-Chalmers screens in the field. See your nearby Allis-Chalmers representative for complete details. Or write Allis-Chalmers, Milwaukee 1, Wis., for Bulletin 07B7812.





No Unloading Troubles - with Car Shaker

An Allis-Chalmers car shaker will unload hopper bottom cars in minutes . . . even if your material is compacted, damp or partially frozen. Takes only 1/2 to 3/4 minutes to unload 1/2 to 6 inch rock. 11/2 to 21/4 minutes to unload wet sand. 1 to 6 minutes for ROM to 10 mesh x 0 coal screenings. Push button operation. Fits all gondola cars. Send for Bulletin 07B7221A.





Designed for Greater Range and Capacity LIMA 2400

This big machine is engineered and constructed for extra-heavy duty. It has met with enthusiastic acceptance, and is setting new performance records on coal stripping and other mining operations.

Features include: "precision" air control of all operating functions; anti-friction bearings at all vital bearing points including drums, cone rollers and hook rollers; large diameter drums for maximum cable economy; truck base and rotating base of heavy one-piece annealed cast steel; extra sturdy construction; easy accessibility of all parts requiring lubrication or maintenance; torque converter power take-off standard equipment for shovel operation; heavy-duty diesel power plant—plus many other features for maximum performance and availability.

The LIMA line includes Shovels 3/4 to 6 yards, Cranes to 110 tons, and Dragline, variable. Offices in principal cities of the world.

LIMA Rubber Mounted Cranes are Available up to 45 Tons Capacity

Cable Address: Limashovel 6-YARD SHOVEL 5-7-YARD DRAGLINE 110-TON CRANE

LIMA

SHOVELS • CRANES
DRAGLINES • PULLSHOVELS



BALDWIN-LIMA-HAMILTON CORPORATION
Construction Equipment Division
LIMA, OHIO, U.S.A.

Construction Equipment Division



Intelligiant in operation at Lemolo No. 1 Dam, Oregon.

controls... water hydraulic, operated by water pressure from giant. coverage...horizontal 320 degrees and vertical 120 degrees.

WATER PRESSURES . . . operates at 30 to 300 pounds.

JOINTS . . . ball-bearing, full flow, leakproof. Completely eliminates gasket replacement.

TIPS . . . 1 inch to 41/2 inches





Write for complete information

The Hydraulic World has waited 90 years...

The INTELLIGIANT eliminates manual labor in the hydraulic field. The operator, in a sitting position and with no effort, controls all vertical and horizontal movements of the giant, and all water pressures and volumes.

REMOTE CONTROLS . . .

For complete safety, one operator, at one remote station, at any required distance from giants, has complete control of one, two or several giants stationed at various points on the job.

MODEL MHA FOR PRESET PATTERN.



1247 WESTLAKE N., SEATTLE, WASHINGTON

Telephone ALder 7725

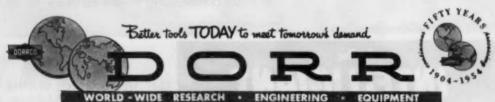


Coming Up. a TRAINLOAD per day of mine backfill...

2000 tons of useable mine backfill — enough to fill forty 50-ton gondola cars — are being produced every day by this DorrClone installation. In operation at a large Canadian gold mill, the installation consists of ten 12" dia. primary DorrClones and six 12" dia. secondary DorrClones with a spare for each stage. Feed to the primaries is 4500 TPD of mill tailings at 50% solids and final underflow from the secondaries is 2000 TPD of backfill with a percolation rate of 4" per hour.

DorrClane is a trade-mark of The Darr Company, Reg. U.S. Pat. Off.

Chances are you don't need a trainload a day, but regardless of your particular mining operation, tailings composition or fill requirements, the DorrClone is an ideal tool with which to solve backfill problems. If you'd like more information on this and similar DorrClone installations, write for Technical Reprints 1307 and 1309. Please address your inquiry to The Dorr Company, Barry Place, Stamford, Conn. or in Canada The Dorr Company, 26 St. Clair Avenue, East, Toronto 5.



THE DORR COMPANY . ENGINEERS . STAMFORD, CONN.
Offices, Associated Companies or Representatives in principal cities of the world.

SYMONS*
PRIMARY
GYRATORY
CRUSHERS



SYMONS*
CONE CRUSHERS



SYMONS "V" SCREENS for extremely fine separation



SYMONS*
VIBRATING SCREENS



SYMONS* VIBRATING



SYMONS* VIBRATING ROD GRIZZLIES NORDBERG MINING MACHINERY

of producers

THE WORLD OVER



NORDBERG BALL— TUBE and ROD MILLS for wet and dry grinding

M153

It is highly significant that wherever ores are found in quantity — efficiency-minded producers are now using, or are in the process of installing, Nordberg Mining Machinery... to assure maximum and continuous production at low operating and maintenance costs.

Write for literature on the machinery you need.



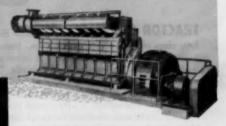
NORDBERG MINE HOISTS

NORDBERG MFG. CO., Milwaukee, Wisconsin



MACHINERY FOR PROCESSING ORES and INDUSTRIAL MINERALS
NEW YORK + SAN FRANCISCO + DULUTH + WASHINGTON + TOPONTO
MEXICO, D.F. + LONDON + PARIS + JOHANNESBURG

NORDBERG DIESEL—
DUAFUEL® and SPARK-FIRED
GAS ENGINES from 10
to ever 10,000 H.P.
in a single engine.



*SYMONS... A REGISTERED NORDBERG TRADEMARK
KNOWN THROUGHOUT THE WORLD

CATALOG, DEVELOPMENT AND DIRECTORY NUMBER, 1954

[World Mining Section-13]

HOW 6 BASIC ALLIS-CHALMERS MACHINES

mechanize and speed mining production

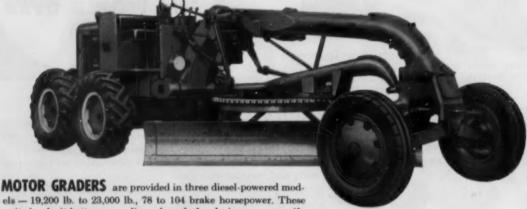
In today's competitive era, mining requires modern, versatile equipment that enables mine operators to increase output per man-hour and keep maintenance time to a minimum. To answer this need, Allis-Chalmers provides a line of newly designed heavy-duty equipment

— 6 basic machines that mechanize and speed material moving and handling in many phases of

mining production.

CRAWLER TRACTORS. Allis-Chalmers builds four sizes of heavy-duty diesel tractors: HD-5—10,500 lb., 40 drawbar hp.; HD-9—18,800 lb., 72 drawbar hp.; HD-15—27,850 lb., 109 drawbar hp. (hydraulic torque converter drive optional); HD-20—41,000 lb., 175 net engine hp.—hydraulic torque converter drive. With cable or hydraulic bulldozer blades they build access roads... maintain tailings dumps... clean up around shovels... cut drainage ditches... dig sludge basins and sluiceways... build reservoirs and pond dams...strip overburden...clear and level building sites... tow equipment.





MOTOR GRADERS are provided in three diesel-powered models — 19,200 lb. to 23,000 lb., 78 to 104 brake horsepower. These units level pit bottoms... dig and grade for drainage... scarify... prepare dragline sites... build and maintain haul roads. A gasoline-powered Model D Grader is also available. It handles routine road maintenance and light construction.

TRACTOR SHOVELS are available for all four sizes of Allis-Chalmers tractors. Standard bucket sizes range from one to four cubic yards—light materials up to seven cubic yards. These machines handle ore, tailings, coal and other bulk materials... clean up around shovels and hoppers and conveyors. Underground they load hauling units and excavate to reach new ore. Units are hydraulically controlled.





4

MOTOR SCRAPERS. The 18-yard (heaped) diesel-powered TS-300 Motor Scraper strips overburden, loads, hauls material from open pit...clears and levels for campsites and drill setups...levels and grades for access roads, building sites...hauls in supplies. A smaller 13-yard (heaped) TS-200 Motor Scraper is also available.

5

PULL-TYPE SCRAPERS. Allis-Chalmers offers a line

of seven scrapers with capacities from 2 to 23 cubic yards. Matched to the four sizes of Allis-Chalmers crawler tractors, these tractor-scraper teams load and haul ore-bearing material . . . handle large-scale stripping jobs.





ROCK WAGON. The TR-200 Motor
Wagon hauls tailings, sand, gravel,
overburden and ore. Unit travels fast
"off-road" with capacity loads . . .
dumps clean every time with 18-ton
hydraulically controlled rear-dump
body. Double layer steel bottom with
oak plank filler absorbs rock shock
of overhead loading. A 22-ton bottomdump Motor Wagon also available.

Get the complete facts on these machines from your nearby Allis-Chalmers dealer.

ALLIS-CHALMERS



SECTIONAL DRILL RODS

more new products of GARDNER-DENVER engineering -

for use with.

Witte for further information

SINCE 1859













CONSTRUCTION, MINING, PETROLEUM

Export Division: 233 Broadway, New York 7, H.Y., U.S.A. Gardner-Denver Company, Guincy, Ilinois, U.S.A.

[World Mining Section-16]

MINING WORLD

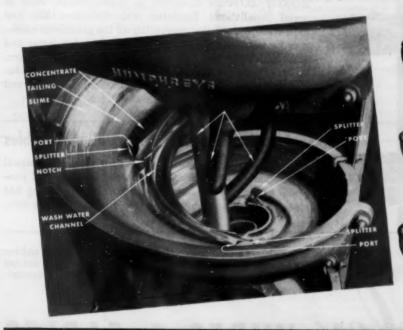
Is Your Mill Losing Values?

Investigate...

HUMPHREYS Spiral Concentrators

Low-Cost Concentration

Humphreys Spirals offer low cost operation, maintenance, installation. Small floor space. No moving parts.



The Humphreys Investment Co. . 915 First National Bank Building

Denver 2, Colorado

AUSTRALIA John Carruthers & Co.

SOUTH AFRICA: Edward L. Buteman

SWEDEN: Sala

LOOK TO for Outstanding Advances Plus A Complete Line of Performance-

Simplex-Tirex Twin Shuttle Car Cables



Feature Gear-Shaped insulated conductors that firmly interlock with the jacket so that even continual twisting of the cable will seldom pull them out of position. They will not twist or override each other. The Selenium-Neoprene Armor is CURED-IN-LEAD for extra toughness. Marked P-101 BM. Available as Type W and Type G.

Simplex-Anhydrex XX Cables



High-voltage cables that assure uninterrupted service at 2,000-17,000 volts operation in underground, duct or aerial installations. Insulated with Anhydrex XX, first high-voltage insulation combining all the properties necessary for trouble-free operation when exposed to water and moisture, heat, ozone and other deteriorating agents. Jacketed with a special neoprene compound that provides steadfast protection against rough handling, soil acids and alkalies, oils, grease, chemicals and flame.

Simplex-Anhydrex Signal & Communication Cables



Light-weight, easily installed cables for telephone, signal and communication circuits. Protected by a special neoprene jacket. No metallic tapes necessary. Insulation has ideal electrical and physical characteristics for these uses.

Available as two-conductor or multi-conductor cables for telephone and communication service. These cables can also be used for block signaling as well as operating electric switch-throwing devices.

WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Mass.

SIMPLEX

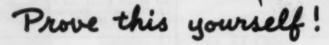
in Mine Cable Design..

Proved Cables for Every Mine Use!

SERVICE	USE	SIMPLEX PRODUCT
MINING	Electric Drills	TIREX SO Cord, TIREX Heavy Duty Mine Cord. TIREX Shot Fire Cord (Round), Simplex Shot Fire Cord (Twin). TIREX Special Shuttle Car Cable (see opposite page). TIREX Twin Mining Cable; Type W, without ground wires; Type G, with ground wires. Also TIREX 3-Conductor Round Cable, Type W. TIREX Locomotive Cable; steel reinforcing strands in conductor. TIREX High-Voltage Cables; Types W, G, SH-A, SH-B, SH-C, SH-D. All TIREX Cords and Cables are jacketed with CURED-IN-LEAD Selenium-Neoprene Armor. All stock sizes for mine use are marked P-101 BM.
MINE EQUIPMENT	Air Compressors (Portable)	TIREX Twin Cables, Types W and G. TIREX 3-Cond. Round Cable, Type W. Anhydrex or Anhydroprene Cables. Both feature the exceptional moisture resistance of Anhydrex insulation and the durability of a neoprene jacket. Anhydrex cables can be installed directly in earth, in conduit and in air. Anhydroprene cables, with lighter jacket, should not be buried directly in earth. Anhydrex Multi-Cond. Signal Cable. Polyethylene-Plastex Signal Cable. Anhydrex Mine Telephone Cable.
PROCESSING EQUIPMENT	Crushers	Anhydrex Cables. Anhydroprene Cables. TIREX SO Cords. Anhydrex Cables. Anhydrex Cables. Anhydroprene Cables.
SHOPS	Machine Tools Welding Machines Electrode Cable Electrode Return Welding Machines Power Side Locomotive Wiring Battery Charging	TIREX SO and SIO (light service) Cords. Plastex Machine Tool Wire; available with light, heavy and extra-heavy insulation. TIREX Super-Flexible Welding Cable. TIREX Single-Conductor Cable. TIREX 2 and 3-Conductor Cables. TIREX Motor Lead Cable. TIREX Twin and TIREX Round Type W Cables.
POWER AND LIGHTING	Aerial Distribution Systems	Anhydrex, Varnished Cambric and Paper Insulated Cables — available with built-in messenger or messenger can be applied in field by spinner. Anhydrex Cables; provide resistance to water and moisture, soil acids and alkalies; have no metallic sheaths to crystallize and corrode. Anhydrex Cables and Varnished Cambric Cables — available with a wide choice of outer coverings to meet the requirements of all methods of suspension. Anhydrex Feeder Cables, Varnished Cambric Feeder Cables. Anhydrex Cables.

Write for Catalog 1008 — "Simplex Cables for Mining"









Take any straight-sided V-Belt (Fig. 1). Bend it—as it bends in going around a pulley. The sides will at once bulge out (Fig. 1-A). Clearly, those bulging sides will press unevenly against the V-pulley—and this causes extra wear at the points shown by the arrows (Fig. 1-A).

Now bend a Gates Vulco Rope
with CONCAVE SIDES (Fig. 2)





Instead of bulging, the precisely engineered CONCAVE SIDES merely fill out to fit exactly in the sheave groove (Fig. 2-A). The sides press evenly against the V-pulley. All wear is distributed uniformly across the full width of the Gates Vulco Rope—and this means longer belt life and lower belt costs for you!

When you buy V-Belts, be sure to get the V-Belt with the CONCAVE Sides—the Gates Vulco Rope!



Gates Engineering Offices and Jobber Stacks are located in all industrial centers of the United States and in 71 foreign countries.

THE GATES RUBBER COMPANY DENVER, U.S.A.

C0+534



Typical Gates Vulca Rope Drive—the Gates V-Belts are built with Concave Sides to insure longer bolt wear.



GM DIESELS GO UNDERGROUND to make trackless mining pay

One of the world's most efficient small underground mines, the American Zinc Company's new North Friends Station mine is proving the economy of trackless operation. With a fleet of three GM Diesel-powered Koehring Dumptors handling the haulage, the mine is producing 500 tons of ore per day—about 25 tons of ore per man-shift. Mine Foreman Bill Armstrong says: "These units run along month after month with almost no repairs. Our costs are much less than we expected."

General Motors 2-cycle Diesels are just as much at home underground as on the surface. Twocycle operation with uniflow blower scavenging gives more complete combustion of low-cost fuel for higher efficiency and cleaner exhaust. Used with exhaust scrubbers and adequate ventilation, mine air stays well within permissable limits. And two-cycle operation means faster acceleration, quicker response to controls, faster haul cycles for increased production.

There's a GM Diesel for every kind of mining job. Specify GM Diesel power in *your* equipment. It will save you money.

DETROIT DIESEL ENGINE DIVISION
GENERAL MOTORS • DETROIT 28, MICHIGAN
Single Units . . . 16 to 275 H.P. Multiple Units . . . Up to 840 H.P.

CATALOG, DEVELOPMENT AND DIRECTORY NUMBER, 1954

AGAIN ... IT'S MACK



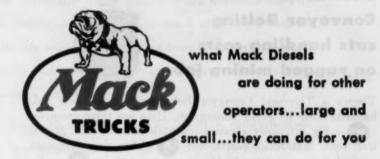
Complete figures for 1953, compiled by the Automobile Manufacturers Association, show that Mack leads all other manufacturers in sales of diesel-powered trucks and tractors.

There must be reasons—and there are! Unparalleled fuel economy and reliability of the Mack Thermodyne® Diesel engine—as revealed by the truly amazing in-service records attested to by important operators all over the country...Plus acceptance of the Mack line of heavy-duty trucks, the only completely new line of trucks introduced since World War II.

That's why, more and more, the swing is to Mack diesels—for the big savings they give in more miles per gallon, less down-time and stand-out performance.

Let us refer you to users of the Mack Thermodyne Diesel whose operating conditions are similar to your own.

IN DIESEL TRUCK SALES



Mack Trucks, Empire State Building, New York 1, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.





Thermoid Conveyor Belting cuts handling costs on rugged mining jobs



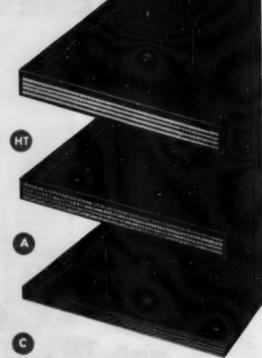
There's a Thermoid Conveyor Belt designed to lower your handling costs on every mining job. Here are three examples:

HT —For extremely abrasive materials such as coal, granite, trap rock, flint rock, quartz ore;

A —For slag, lime rock, crushed stone and other highly abrasive materials;

C —For moderate abrasives such as sand, loam, soda, gravel.

Thermoid's exclusive impregnation process welds carcass and cover into an exceptionally strong, durable belt. Finest quality reinforcement and specially compounded rubber stocks assure long life...lower your handling costs per ton. Your Thermoid Distributor can help you select the Conveyor Belt best suited to your requirements. Or if you prefer, write direct for Catalog #3679.

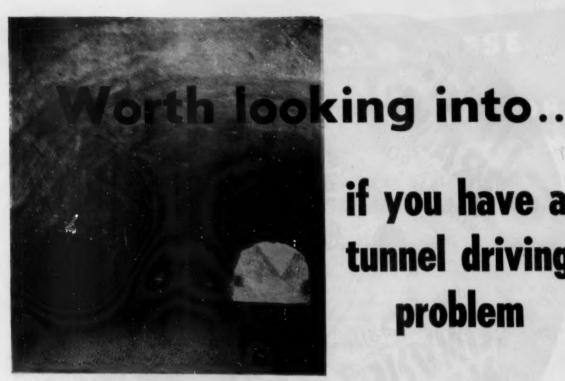






Conveyor & Elevator Belting © Transmission Belting © F.H.P. & Multiple V-Belts
Wrapped & Molded Hose © Rubber Sheet Packings © Molded Products
Industrial Brake Linings and Friction Materials

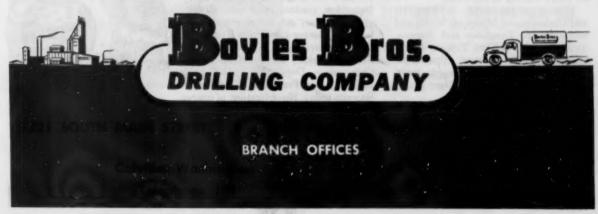
Offices and Factories: Trenton, N.J. Nephi, Utah



if you have a tunnel driving problem

Those lateral drill marks - left side of the picture - are the trace lines of a Boyles Bros. long-hole drilling operation . . . a mark of efficient tunneling. The excellent results are evident . . . a clean bore with neatly arched contour . . . uniform walls and back . . . all accomplished in record time with Boyles Bros. know-how and equipment.

Over 50 years of drilling experience have built Boyles Bros. reputation for completing jobs as per agreement. Consult us for any of these services: DIAMOND DRILLING TUNNEL DRIVING CONTRACT MINING DAM-SITE EXPLORATION and GROUTING





This reel means LOWER COST OF MINING FOR YOU!

Wherever you see the big yellow and black reel of Tiger Brand Wire Rope, you'll recognize another mining operation that's striving for lowest possible production costs.

For Tiger Brand Wire Rope provides greater safety, longer life, lower costs on every mining application.

Throughout the world—in Open Pits and Underground Mines, on Shafts and Slope Hoists, Draglines and Shovels, Tuggers and Slushers, Tractor Power Take-Offs, Car Spotters, Tramways, Churn Drills—wherever muck, tools, or equipment are moved...Tiger Brand ropes are on the job.

For every mining application there is a specially-designed Tiger Brand Wire Rope... proven in use to do the work with more safety and at lower cost.

To help you get the most out of your Tiger Brand Wire Rope, you're welcome to the free services of a Tiger Brand Field Engineer. For further information, contact your local distributor. You can get a free copy of the booklet "Longer Life From Your Wire Rope" by writing to Columbia-Geneva Steel Division, United States Steel Corporation, Dept. MWA, 1403 Russ Building, San Francisco 6, California. So write today. No obligation, of course.





USS TIGER BRAND Wire Rope

United States Steel Corporation · Columbia-Geneva Steel Division In the East: American Steel and Wire Division

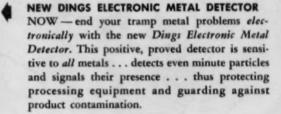
UNITED STATES STEEL

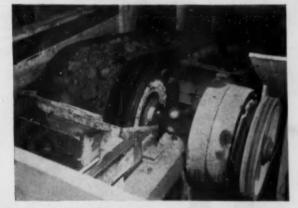


MATCH THESE MAGNETS AGAINST TRAMP IRON



There's a DINGS to handle each job — best

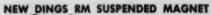




DINGS PULLEYS

Here's perfect low cost iron removal for normal belt burdens. Dings electric or non-electric strongest you can buy—hold mag-

Alnico pulleys—strongest you can buy—hold magnetics in an iron grip, discharge them separately. Ask for catalog.



750

For pulling iron from fastest belts, deepest burdens, here's the mightiest member of Dings force

—RM models available to pull iron through 30 inch air gap. New Dings RM uses less current, weighs less in proportion to strength—radical pancake design takes less room, dissipates heat faster. Write for bulletin on the most powerful rectangular magnet yet.



These are only a fewget the complete story on the most powerful line of magnetic separators available—in Catalog C-5000-B, write:







PULLEYS — RLECTRIC AND NON-ELECTRIC



DINGS NON-ELECTRIC



DINGS RM RECTANGULAR SUSPENDED



"need special abrasives?"



LET REPUBLIC SUPPLY YOUR NEEDS!

You'd have to file away a lot of data to have all the answers to many tough abrasive problems. But Republic Supply's factory experts are always ready to help you with an on-the-spot recommendation and answers to a wide range of abrasive problems. Whether your operation is a grinding wheel, disc, belt or paper, Republic's complete stocks of ARMOUR and BAY STATE abrasive supplies are available at a moment's notice.

MORAL: For all your industrial needs—and technical advice—for top-quality supplies, and fast, friendly service—let REPUBLIC SUPPLY your needs!

THE REPUBLIC SUPPLY COMPANY



tos Angeles Office -- phone: RAymond 3-2511; Son teandro -- phone: LOckhoven 2-0414; Phoenix -- phone: Atpine 4-3434
Pipe, valves and fittings * abrasives * shop supplies and tools * rigging materials * mechanical rubber goods * machinery * oil field supplies



Our house? Built with wire rope?

Not only yours, Mr. Brown, but millions of others too.

A miracle of the postwar years has been the construction of more than 7-million new dwelling units. Accomplishment of this tremendous task has called for "muscles of steel"—rugged wire rope that is a vital factor in mining the ore, quarrying the stone and bringing out the timber that comprise the basic components of every house and building—large or small.

Supplying these "muscles of steel" to the giant that is American industry is our big job here at Wickwire—a job we've been doing well for over half a century.

In the mines... the quarries... the logging camps—and wherever wire rope is used, they'll tell you that for utmost safety, longer life and most economical service you can always count on the quality and strength that is built into Wickwire Rope.

A YELLOW TRIANGLE ON THE REEL IDENTIFIES WICKWIRE ROPE

THE COLORADO FUEL AND IRON CORPORATION—Abilene (Tex.) • Denver Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa PACIFIC COAST DIVISION—Los Angeles • Oakland Portland • San Francisco • Seattle • Spokane WICKWIRE SPENCER STEEL DIVISION—Boston • Buffele • Chattanoega Chicago • Datroil • Emploration (Pa.) • New Orleans • New York • Philodelphia

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION THE COLORADO FUEL AND IRON CORPORATION



SMIDTH

ROTARY KILNS

For sintering, nodulizing, calcining, desulphurizing and oxidizing and reducing roasting-also coolers, precoolers, preheaters, recuperators—and their accessories.

GRINDING MILLS

Ballmills, tubemills and multi-compartment mills-wet or dry grinding-open or closed circuit-also air swept for grinding and drying.

F. L. Smidth & Co., A/S

F. L. Smidth & Co. of Canada, Ltd. F. L. Smidth & Co. (Bombay) Ltd.

F. L. Smidth & Co., Ltd.

AN ACCOUNTING OF THE MINERAL INDUSTRY **FOR 1953**

By V. L. Mattson Director Colorado School of Mines Research Foundation Golden, Colorado

At the beginning of 1953, the mineral industry faced one of the greatest seller's markets of all time. There seemed little prospect of meeting the mineral requirements of the defense demands of the nations of the Free World. The United States mineral industry met the challenge with a record mineral production valued at over \$14,000,000,000.

The cessation of Korean hostilities occurred at a time when most strategic metal production programs were considered in fairly good condition. This caused a slackening in buying which, at the end of the year, created a buyer's market in many metal and mineral commodities.

While the production of domestic lead, zinc, and copper in 1954 will be considerably under that of the year 1953, there is little to indicate that there will be any important let up in the overall plan to meet our increased metal requirements of the future.

Inventory reductions, which are to be expected as the supply picture improves, have tended to over-emphasize the reduction in metal consumption rates.

The United States government has announced its intention to continue to will seed the supplement of the continue to will seed the supplement of the continue to will seed the supplement of the seed of t

The United States government has announced its intention to continue to build stockpiles of strategic materials until the defense goals are met. An upward revision of the titanium goal is now under consideration.

Funds that are presently committed for new mineral industry plant construction are firm evidence of confidence in the

try plant construction are firm evidence of confidence in the future.

Foreign competition can be met only with efficient modern plants capable of utilizing, to the fullest extent, the many new tools available to the industry.

The ultimate cost of the expansion program in the Lake Superior region alone is estimated at over \$1,000,000,000. The Greater Butte program, and the tremendous activity in the Arizona copper district attest to a determined effort to make the United States as independent as possible of foreign copper. The need for sound National Mineral Policy in Washington was never greater. In March 1953, Charles Will Wright outlined in Mining World the need for a firm and objective government mineral policy. He pointed out in this article that the long list of agencies dealing with mineral industry matters frequently overlap to such an extent that a unified policy is nearly impossible. Mr. Wright suggested that a solution to this dilemma would be to unite all of these agencies under a competent Under-Secretary of Mineral Supply. Such a post was created in the Interior Department later in the year, Felix E. Wormser was appointed Assistant Secretary for Mineral Resources. In September Mr. Wormser spoke of such a policy as follows:

as follows:

"A minerals policy must contribute to a strong and vigorous domestic mining industry by intensifying exploration, discovery, and full utilization of our resources. This policy must serve to promote the national interest and must be consistent with an interest and must be consistent with a consistent with a consi promote the national interest and most be consistent with an enlightened foreign economic policy, at the same time taking into account the legitimate needs of domestic producers as we move forward in our efforts to lift the scores of barriers to liberalized trade now prevailing throughout the world. Such a policy must look toward greater freedom of the market place,



less intervention, support, or control by government; in other words, a maximum of free enterprise."

The individual minerals are discussed in some detail in the chapters that follow this brief review of technical progress in exploration, mining methods, and ore treatment practices.

EXPLORATION

There can be but little doubt that geophysics held the center of the exploration stage in 1953, but for the first time it has had to share some of the limelight with geochemical developments. One of the encouraging achievements in the field of exploration during the past year has been the excellent cooperation between government and privately sponsored programs. The extensive exchange of data, and the willingness and enthusiasm of various exploration groups to consult on problems of data interpretation, is most encouraging.

As is to be expected, the uranium exploration program not only represented the major field of exploration program not only represented the major field of exploration activity in this country, but throughout the world.

Five years ago, the uranium locations outside of the Colorado Plateau area could be counted on your fingers. Today they are numbered in the hundreds, and those states which have not uncovered deposits of possible commercial importance can be counted on your fingers.

Advances in geophysical methods of exploration have followed closely the development of more sensitive and more stable airborne radiation detection instruments. As more data has become available for study and analysis by larger groups, there have been important advances in the art of geophysical data interpretation. Increased use of the helicopter for low level studies has immeasurably extended the field for airborne exploration of uranium ore.

The developments in equipment for gravity exploration have not been as meeticalar as those in the field of radiographic

exploration of uranium ore.

The developments in equipment for gravity exploration have not been as spectacular as those in the field of radiographic exploration, but they were important last year. Aerial surveys which combine the collection of data on radioactivity and magnetism have provided a distinct cost advantage as well as increasing chances for the discovery of ore.

Significant developments in seismic practice have appeared in the past few months. Accurate information has been secured in oil field exploration on a procedure for mapping very thin beds. An adaptation of this procedure to mining problems may greatly extend the field of usefulness of the seismograph

for ore exploration. Improved explosive charges for seismic work which are now under development will probably not only speed up field work, but may provide additional data from a given shot. A means for utilizing millisecond delays in primacord offers new safety features as well as new technique possibilities in seismic work.

Geochemical prospecting has accounted for a number of major discoveries in the past year. Important research grants have been made available for further studies in this field. As research continues, and data from various investigations can research continues, and data from various investigations can be correlated, we can expect spectacular developments in geochemical exploration. The vigorous support of work in this field by the United States Geological Survey is certain to encourage private investigation with this new exploration tool. This interest is world wide. Important surveys are reported from Australia, Finland, and various European countries. A more complete understanding of the many factors that are significant in interpreting geochemical and biochemical data as they affect mineral exploration will be one of the important developments of this year.

developments of this year.

The value of color aerial photography as an aid in geochemical prospecting will be studied in a survey of existing mining districts. There is evidence that these photographs may indicate errors in early ground mapping. New concepts of the location of faults and other structural features may provide aids in picking up extensions of ore bodies.

Advances in diamond drilling techniques have contributed to the unusual exploration record of the past year. R. D. Longyear reports interesting developments in the diamond drilling field. Several diamond drill holes are reported which reached depths in excess of 6,000 feet.

Directional drilling has been aided by the development of retrievable wedges. Diesel-powered mobile drill units have resulted in lower labor costs.

retrievable wedges. Diesel-powered mobile drill units have resulted in lower labor costs.

Improved core barrels have resulted in higher core recovery in difficult ground. The development of the wire line core barrel

in difficult ground. The development of the wire line core barrel by E. J. Longyear Company eliminates the need for removing the string of drill rods except to change the bits. The core is removed through the hollow drill rod by an ingenious lifting mechanism operated by a small wire line.

The rapid development of improved methods for geophysical prospecting has resulted in an active world-wide search for ore of every description. Extensive geophysical surveys are reported from numerous points in Europe and the Near East. Africa reports intensive geophysical exploration from widely separated points. India and Japan have important seismic and magnetic surveys under way. Important new discoveries of uranium and lead in Australia have resulted from geophysical surveys during the past year. surveys during the past year.

MINING TECHNIQUES

In 1952 the important development in mining techniques was the trend toward more complete mechanization. Continuation of this trend at an accelerated rate was the outstanding feature in mining during 1953. Replacement of rail equipment with heavier rubber-mounted trackless Diesel equipment has been significant both in the United States and abroad during

with heavier rubber-mounted trackless Diesel equipment has been significant both in the United States and abroad during the past year.

Increased use of belt conveyors underground has resulted in several important new underground crushing installations. Research, both in England and in the United States, has produced notable improvements in conveyor belt construction for underground use. Progress in development of fire-resistant materials for belt construction, and materials which do not give off toxic fumes when heated, is reported from England.

The economic size limit of open-pit haulage equipment has apparently not yet been reached. At Bagdad Copper Company last year, one 60-ton truck and one 50-ton truck were operated. A new 6%-yard electric shovel is used for truck loading. The trend toward heavier trucks is also noted on the Lake Superior Iron Ranges. A 50-ton end dump truck is on trial in one of the pits, and 34-yard trucks are in general use. Six- and eight-yard shovels are regularly used for truck loading on the Iron Range.

A trend toward more general use of alternating current underground is apparent in some sections of the country. Improved controls are making direct current less essential.

Explosive Developments: There were no outstanding new explosive products announced in 1953. The field of application for duPont's Chemechol was greatly expanded when it was declared a "Permissible" in April of 1953. Chemechol will find its principal application in breaking coal, but there may be an application in the potash mines as well as in other non-metallic mines where it is desirable to break with a minimum of fines. In this system a tube similar to a Cardox cartridge is placed in the drill hole. Inside the tube is a gas generating unit composed of a starter mix and a pressure mix. A metallic starter ribbon is connected electrically to the plug. The chemical reaction is started by means of sn electri-

cal current flowing through the ribbon in the starter mix. In the end of the tube opposite the plug a rupture disc is placed to control the maximum pressure which can be built in the tube. Rupture discs of variable thickness can be used to pro-

tube. Rupture discs of variable thickness can be used to provide the optimum pressure for each installation.

A new fuse igniter is sold under the trade name "Thermalite." This system consists of cord of definite burning speed, a connector which is crimped to the end of the fuse and which contains a small ignition charge. These connectors are slotted on one side to receive the igniter cord. The system also has a small 'electric starter' for spitting the igniter cord. This device not only provides additional safety features, but insures closer control of firing intervals.

Millisecond delays are now possible with a new Primecord.

insures closer control of firing intervals.

Millisecond delays are now possible with a new Primacord circuit connector. This is finding useful application not only in quarry blasting, but also in seismic shooting.

The past year has seen a great increase in the use of "condenser discharge" type of blasting machines. These machines not only provide an important safety factor, but save connecting time where a large number of holes are shot at once. They are becoming very popular in the potash mines of the Carlsbad district.

They are becoming very popular in the potash mines of the Carlsbad district.

Certain metallic dusts have been added to increase the propelling power of military explosives. It seems likely that these may be adapted to certain "heaving" types of commercial

explosives

The replacement of steel casing with paper for use in nine-inch churn drill blast holes is reported from one Arizona

Drilling Procedure: Two diverse trends in drilling procedure were very apparent in 1953. For open-pit work, the swing is to heavier drilling equipment; while underground the popularity of the light "air leg" type of drill is sweeping the mining world.

Portable rubber-mounted or crawler-mounted quarry units

Portable rubber-mounted or crawler-mounted quarry units with both percussion and rotary type drills mounted on adjustable brackets are actually vertical hole "jumbos." One of these units, which is self-propelled, is complete with air compressor, and mounts two chain-fed heavy drifters.

It would be impossible to overstate the headway that has been made by the light "air leg" drill during the past year. Reports from mining camps all over the world attest to this world-wide revolution in drilling procedure. The expanded use of lighter drills has naturally increased the use of lighter steel and smaller bits. steel and smaller bits.

steel and smaller bits.

Up to this time there have been few comprehensive tests that adequately compare total costs of breaking rock with "air leg" drills and conventional column-mounted "Leyner" drills. Lower air consumption, greater portability, smaller capital investment and less operating skill are the features that have made the "air leg" drill so popular.

The popular hole size with the "air leg" is 1% inch although studies with considerably smaller holes are the subject of some experimental work. Research with ultra-high frequency percussion drills is also under way.

The popularity of the lighter drills has emphasized the

The popularity of the lighter drills has emphasized the need for more metallurgical research on drill steels and bits. Specifications for a practically ideal drill steel have been written by one drill manufacturer. A steel has been recently placed on the market that comes very close to meeting these

specifications.

Jumbo mounting of the heavier drills has produced some interesting developments during the past year. Complete remote control of all drilling operations is incorporated in one experimental self-propelled jumbo. Most of the newer jumbos are rubber-mounted and extremely flexible.

Diamond blast hole drilling seems to be definitely giving away to percussion type drilling in most types of rock. This is a continuation of a trend that was evident over a year ago. Jet plercing of taconite continues to look feasible as more experience records become available.

experience records become available.

Roof Support: A year ago there was little doubt about the bright future ahead for roof bolting. Progress with this relatively new development during the past year was sufficient to remove any doubt that might have remained with the most skeptical miner.

Numerous new techniques in rock bolting practice appeared during the past year. Lacing between bolts with flat steel straps has proved effective in one New York iron mine. Bolts are being quite generally used now to hold hanging wall slabs, and for general stope wall support. They are being used as floor supports in some mines.

Climax Molybdenum Company has found that rock bolts provide a convenient means for holding war surplus steel landing mats against fractured concrete surfaces in its slusher drifts.

The acceptance of rock bolting practice abroad was very noticeable in 1953. It is solving many difficult problems in

widely separated parts of Africa. The practice is growing rapidly in the Scottish coal mines

An interesting development that may have some bearing on the subject of mine support concerns a method of timber preservation now under investigation. The method, which uses natural forces to impregnate the timber, is not believed to be new, but its use with chlorated zinc chloride may have interesting possibilities.

The growing tree is girdled near its base and a rubber inner tube is wrapped around the opening in the bark so as to form a reservoir for the preserving liquid. The liquid is carried along with the sap throughout the tree. The cost is said to be lower than that required for pressure treatment of the cut timber. Telegraph poles have been treated in Finland by a similar process for some time with satisfactory results.

resuits.

Mining Methods: It is to be expected that the general trend toward mechanization in mining should result in less selectivity and a higher dilution of ore with waste. Increased application of block caving methods appears to be further emphasizing the dilution of the caving methods appears to be further emphasizing

this dilution of ore.

A new shaft sinking record was established in South Africa in May of 1953. The Vlakfontein No. 2 shaft of the Vlakfontein Gold Mining Company, Ltd. was sunk from 3,348 feet to 3,933, a distance of 585 feet in one month. This is a circular shaft measuring slightly over 24 feet inside the concrete lining. The complete details of this remarkable accomplishment were described in the August 1953 issue of MINING WOILD. The air-operated "cactus" grab or orange peel bucket digs into the broken rock at an astounding rate. Over 100 tons an hour of rock was loaded and hoisted during this operation. Another notable shaft sinking job is the Bunker Hill & Sullivan Mining and Concentrating Company's shaft at the Crescent mine. It features special shaft mucking and drilling equipment. During September, an average advance of 9.2 feet

rne Crescent mine. It reatures special shaft mucking and drilling equipment. During September, an average advance of 9.2 feet per day was maintained.

A unique development in shaft sinking practice is the use of 36 inch diameter Calyx drill holes in the Temple Mountain uranium district on the Colorado Plateau. Holes of this type well over 100 feet in depth have been used to mine ore bodies; in that area. bodies in that area

The new hoist at the Frood-Stobie mine of the International Nickel Company of Canada in the Sudbury District is the largest in Canada. It employs a 6,000-horsepower dual motor and handles 15-yard bottom dump skips.

Another new hoist at International Minerals & Chemical Corporation's main shaft at Carlsbad has doubled the hoisting capacity. Remote hoist control has moved the hoist man from the hoist house to the collar of the shaft. Operation is completely automatic.

Developments in mine communication last year included the use of a carrier circuit system for cage to hoist man communication in the Lyon Mountain mine of Republic Steel Company's Port Henry Division. The use of a micro-wave radio installation is reported from the Knob Lake district in

Labrador.

Mine Safety and Health: The U. S. Bureau of Mines is investigating the use of a portable telescopic shield for use in advancing coal mine headings.

Encouraging results are reported in silicosis control by the McIntyre Foundation during 1953. The silicosis incidence rate among miners who have been subjected to the aluminum dust program has been greatly reduced.

ORE TREATMENT

The basic mining trends toward less selectivity have not simplified the problems of the mill man. A general lowering of the grade of mill heads along with lower metal prices has emphasized the need for close study of costs in every phase of milling. A fraction of a cent per ton in operating costs, or a fraction of a percent in recovery can make or break a mill man today.

Mining methods which are bringing more waste to the mill not only lower mill heads, but introduce serious metallurgical problems as well. Country rock or overburden dilution can cause trouble from crusher to filter. Unexpected primary slime, resulting from a change in mining practice, has fouled more than one floation circuit during the past year.

The ingenuity of the mill man will be taxed to keep costs in line. Milling developments during the past year indicate that he intends to carry his part of the load.

Crushing and Grinding: From the standpoint of size, the outstanding crusher development is the huge gyratory now under construction by Allis-Chalmers Manufacturing Company for crushing taconite. This crusher is 60 by 109 inches and will have a capacity of 3,000 tons per hour. It will be driven by two 500-horsepower motors. The new Storke Level crushing plant of Climax Molybdenum Company which was placed in

operation during 1952 is indicative of the trend toward larger crushing units with small reduction ratios. It has crushed 13, 350 tons of ore in eight hours.

Contributions to grinding theory and practice were not significant in 1953. Discussion of previous work continued in a number of excellent papers which were presented during the year. Renewed interest in spiral shell liners for ball mills appeared when Allis-Chalmers released some significant data on this subject. This same company has reported their continued interest in the vibrating ball mill. This interesting device seems to still be some distance from being a commercial grinding machine.

vice seems to still be some distance from being a commercial grinding machine.

Discussions of grinding practice have pointed out the difficulty of comparing results from different grinding installations. Not only variations in character of ore but many operating variables make it extremely difficult to draw conclusions regarding the relative merits of grinding equipment. From the standpoint of size, the new Marcy ball mills being installed by White Pine Copper Company are unique. The inside diameter of these mills is 12% feet, and they measure 13 feet between the feed and liner and the grate at the discharge end of the mill. They will be driven with 1,500-horsepower synchronous motors.

At least two Canadian mills are continuing the use of pebbles instead of balls as grinding media. An experimental mill is operating on the Iron Range using ore as grinding media.

Oliver United Filters has acquired rights to the centriclone and is carrying out an extensive program to obtain additional data on the performance of this interesting classifier. Results of operations of Dutch State cyclones on both primary and secondary grinding circuits by Rand Leases Vogelstruistontein Gold Mining Company Limited were released. Successful replacement of mechanical classifiers with cyclones seems likely under certain operating conditions. New cyclone installations on the Iron Range will be closely watched this year.

The Dorr Hydroscillator may be in the news again this year. Three new installations are reported for the Iron Range and one additional machine may go to Tennessee Copper Company.

Numerous installations of electrically heated screen cloth for

Company.

Company.

Numerous installations of electrically heated screen cloth for handling damp ores were reported last year. Perforated rubber-covered steel plates have been used for coarse screening. Fine screening has replaced classification in an effort to prevent overgrinding of easily slimed tungsten minerals.

Flotation: The important flotation installations that were started in 1953 on the Iron Range will not be completed until this year. Specular hematite will be recovered by flotation at the two new units of Cleveland-Cliffs Iron Company.

Increased attention has been given to the effect of slimes on flotation. Methods of chemical control which will not only conserve collecting reagents but improve recovery and concentrate grade were the subject of investigation last year.

Gravity Processes: From the standpoint of sales of equipment, Heavy-Media Separation appears to have lead the gravity concentration field.

Mining World in its June 1953 issue described the use of

MINING WORLD in its June 1953 issue described the use of spirals to recover the non-magnetic iron mineral martite at the Star Lake, New York plant of Jones & Laughlin Steel Corporation. At this installation 80 rougher spirals are followed by 40 cleaners and 40 re-cleaners. They treat 2,700 tons of low grade iron ore a day to produce about 900 tons of concentrate running better than 61 percent iron, Martite is non-magnetic and does not respond satisfactorily to conventional iron ore treatment methods.

Chemical Methods: A new twist to the recovery of uranium from South African gold tailings is reported. Residual slime from which gold has been previously extracted is being treated with sulphuric acid and manganese dioxide. This treatment takes the uranium salts into solution. They are then precipitated as a hydrated uranium oxide. Enough pyrite is recovered from the tailings to provide the source for the sulphuric acid which is used in the process.

The cobalt-nickel recovery plant of the Calera Mining Company at Garfield, Utah is still having "start-up" troubles. A recent agreement between Calera's Parent Company—Howe Sound Company—and Chemical Construction Company will make possible the installation of equipment that is needed to withstand the highly corrosive solutions used in this process. Interesting results are expected from extensive research projects involving continuous ion-exchange techniques. MINING WORLD in its June 1953 issue described the use of

ACKNOWLEDGMENTS

The writer is indebted to and wishes to thank the numerous mining men from various parts of the world who have contributed reports of progress used in this paper. I also want to thank those members of the Colorado School of Mines Research Foundation who have contributed information to this

METALS AND MINERALS REVIEW

ALUMINUM



By KEEN JOHNSON Vice President Reynolds Metals Company Louisville, Kentucky

In 1953, despite production cutbacks caused by electric power shortage resulting from drought conditions in the Northwest and the Tennessee Valley, the aluminum industry produced 1,252,015 short tons of pritons. Thus, despite the drastic decline in power availability the industry, through its privately financed post-Korean expansion program, was able to increase its production over 1952 by 315,015 tons, or almost 34 percent.

About 33,000 tons of primary aluminum production was lost in 1953 because of the cutbacks in power availability. Roughly half that amount, 16,000 tons, was lost at reduction plants in the Northwest early in the year as a result of one of the most severe droughts in the history of that region. The remainder of 17,000 tons was lost in the TVA area in the last quarter of the year when low rainfall forced the shutdown of five potlines at Alcoa, Tennessee.

Alcoa, Tennessee.

Virtually all the new facilities built under the post-Korea expansion program, financed with money borrowed from private sources, have been completed, although full production has not

UNITED STATES MINE PRODUCTION OF METALS

been reached in all plants. Reynolds Metals Company brought its newest plant at Arkadelphia, Arkansas into operation in January, 1954. The 55,000-ton annual operation brings the company's total yearly capacity to 414,500 tons. The Arkadelphia plant is the nation's 16th aluminum reduction operation; Aluminum Company of America has seven, Reynolds Metals Company six, and Kaiser Aluminum and Chemical Corporation

three.

Two more reduction plants are under construction: one by Anaconda Copper Mining Company at Columbia Falls, Montana, the other by Harvey Machine Company at The Dalles, Oregon. When these facilities are completed, the 19 operations will have a total capacity of more than 1,500,000 tons of primary aluminum, exclusive of a 75,000-ton-capacity operation under a special stockpile contract by Alcoa.

The "third round" expansion program, involving Olin Industries, Inc's 110,000 tons and Wheland Company's 50,000 tons, has not been fully implemented. The subject has been discussed by the Defense Mobilization Board, but final decision has been postponed. Apparently the deciding factor involves the requirements of the Department of Defense.

Total supplies of bauxite increased to 6,100,000 long tons in 1953 as compared to 5,165,000 tons in 1952. While domestic

production remained unchanged at 1,600,000 tons, imports increased by 1,000,000 tons to 4,500,000 tons; this gain was due

creased by 1,000,000 tons to 4,500,000 tons; this gain was due entirely to receipts from new mining operations in Jamaica. Reynolds officially opened its installation for mining and treating bauxite in Jamaica in January, 1953. In February, the first shipload of bauxite left Jamaica for Kaiser's alumina plants at Baton Rouge. These operations in Jamaica reduced the haul to Gulf Coast ports to approximately 1,200 miles, compared with 2,500 to 2,700 miles from Surinam and British Guiana. Particularly important is the fact that at no point are the shipping lanes from Jamaica out of range of the protection of land-based aircraft.

ping lanes from Jamaica out of range of the protection of land-based aircraft.
Reynolds Mining Corporation began the development of its aluminum ore reserves in Haiti. The Haitian project is expected to cost several million dollars and will operate with a smaller capacity than the company's Jamaican operation. The installation's design will permit a very rapid increase in operations whenever industry conditions warrant.

The opening of Reynolds' Alumina plant at La Quinta, Texas in 1953 marked the completion of the expansion program for alumina. As part of this program, Alcoa increased its alumina production capacity at its Mobile, Alabama and East St. Louis, Illinois plants and constructed a new, combination Bayer and sinter plant at Bauxite, Arkansas for processing high silica Arkansas bauxite.

Arkansas bauxite.

Reynolds increased the capacity of its combination type plant at Hurricane Creek, Arkansas and equipped it to operate partly on Jamaican ore. In addition, Reynolds constructed a new alumina plant at La Quinta, near Corpus Christi, Texas, to

process Jamaican ore entirely.

Kaiser increased its alumina capacity at Baton Rouge, Louisiana and installed facilities to treat Jamaican ore.

The expansion of the alumina capacities under the program are shown in the attached table.

ESTIMATED ANNUAL ALUMINA CAPACITY OF THE UNITED STATES*

Plants and Location	Before Expansion	Increase	Total
Aluminum Ore Co. (Alcoa) Mobile, Als. East St. Louis, III. Bauxite, Ark.	602,250 182,500	234,750 146,000 401,500	837,000 328,500 401,500
Total	784,750	782,250	1,567,000
Reynolds Metals Company Hurricane Creek, Ark. La Quinta, Texas	521,000	204,000 365,000	725,000 365,000
Total	\$21,000	569,000	1,090,000
Kaiser Aluminum & Chemical Corp. Baton Rouge, La.	440,000	340,000	780,000
TOTAL	1,745,750	1,691,250	3,437,000

" In short tons

ANTIMONY



By James P. Bradley Vice President **Bradley Mining Company** San Francisco, California

In comparison with the States consumption of primary antimony declined 3 percent during 1953 and imports fell off 10 percent. Do-

mestic mine output of anti-mony for 1953 is estimated at only 100 tons—the lowest level of production since 1931. United States consumption of primary antimony exceeded total

supply (imports plus domestic production) by over 2,000 tons during 1953 and industrial inventories dropped steadily throughout the year. The supply-demand picture for the past two years is shown in the included table.

United States Primary Antimony Supply-Demand Data For 1952 and 1953 In Short Tons Contained Antimony

	1952	1953
Net imports Mine production Total Supply Consumption	12,663 2,160 14,823 14,300	11,467 100 11,567 13,900

* Preliminary information

The Free World production of primary antimony during 1953 is estimated at only 25,000 tons, as compared to normal Free World requirements of 40,000 tons. The indications are that Free World inventories of primary antimony have been declining during the past year and a half.

According to industry estimates, the United States strategic stockpile contains about 20,000 tons of primary antimony—or enough to last only six months at the World War II peak rate of consumption. In view of our nation's high dependence (practically 100 percent at present) on far off and uncertain foreign sources, our stockpile of antimony appears to be dangerously inadequate. gerously inadequate.

The major domestic producer (Yellow Pine mine and smelter, Stibnite, Idaho) discontinued production in mid-1952 due to the competition of foreign antimony sales at depressed prices and remained shut down during 1953. There are no immediate plans for resumption of production at this property,

immediate plans for resumption of production at this property, but exploration work is continuing under DMEA contracts. Important research programs aimed at the finding of new uses for antimony are in progress in the fields of electronics, ceramics and metallurgy. The successful development of the antimony semiconductor compounds (particularly the intermetallic compound of aluminum and antimony) during 1953 opened up a whole new field of investigations in the electronics industry and stimulated extensive research on the part of both industry and the government.

BERYLLIUM



By D. H. HERSHBERGER Brush Beryllium Company Cleveland, Ohio

Miners of the beryllium ore, beryl, are far outstrip-ping its consumers, showing pmg its consumers, snowing more than a three to one ratio of supply to consump-tion for the year 1953. The General Services Administra-tion continues to buy for the National Stockpile, stimulat-

ing production by sustaining the market. ing production by sustaining the market.

During the year the price eased from \$48.00 per percent of contained BeO in the short ton to \$46.00. Approximately \$4,260,000 was paid for the new supply of 9,000 tons of beryl,—by far the largest supply of any year.

The fact that the total beryl stocks on hand in the United States at December 31 are estimated at about 20,000 tons, or

States at December 31 are estimated at about 20,000 tons, or more than seven years' requirements at the current rate of consumption, should increase the industry's commercial market. Many potential applications of beryllium products have been avoided through the mistaken belief that the ore was in short supply and that large quantities were used for nuclear experiments. The world's producers, however, have refuted this idea by actually delivering excessive supplies of the ore. The accompanying table shows how the imports increased by 38 percent over 1952 and that the domestic shipments increased by 46 percent. The latter increases was due reinarily to the Covernment.

over 1952 and that the domestic shipments increased by 46 percent. The latter increase was due primarily to the Government Depot Purchase Program the termination date for which was extended from June 30, 1955 to June 30, 1957.

The imports from Argentina were large enough to show that new mining is being carried on there. Brazil's bid to consume some of its beryl in a plant at Recende has not yet materialized. Operation of the plant is expected to commence this year now that the country's credit position has improved and necessary equipment can be imported. The year 1953 was the first in which an important amount of beryl was permitted to be exported by Madagascar to the United States. Occurrences of good

United States Receipts of Beryl in Short Tons by Countries of Origin For 1951, 1952 and 1953

Country of Origin	1051	1952	19531
Argentina	0	550	1 513
Brazil	1,094	550 2,590	1,513 2,696
British East Africa	1,094	2,390	22
Finland	40	10	0
French Morocco	23	118	23
India	440	196	23
Korea	0	1	g g
Madagascar	0	0	331 410 377
Mozambique	174	308 105 931 1,156 515	410
Portugal	98	105	377
Southern Rhodesia	174 98 691	931	1,296 1,369 750
Union of South Africa	1.722	1,156	1,369
United States of America	483	515	750
Other	12		
TOTALS	4,799	6,493	8,995

grade beryl were reported in Surinam and in Venezuela, but production has not been undertaken.

production has not been undertaken.

Recent surveys have indicated reserves of beryl susceptible to hand-cobbing of more than 333,000 tons. Other indicators in 1953 suggest twice that amount in the United States alone in the form of low-grade ore. Beneficiation of low-grade ore is still in the testing stage, but in 1953 the first pilot plant for continuous flotation of beryl was brought into operation at the U. S. Bureau of Mines, in Rapid City, South Dakota. Some work has been done there on pegmatite beryl to recover the fines, but important technological developments will have to be made to concentrate the low-grade ores which have been tested.

important technological developments will have to be made to concentrate the low-grade ores which have been tested.

Expansion in the industry's capacity was planned and the financing provided during the year. The diminishing trend, however, illustrated by the 1953 consumption of 2,661 tons, or 50 percent of capacity, caused some deferment of action. Thoughts turned toward diversification which in essence could mean dilution of efforts to develop to matuurity the potentialities of heavellium.

ties of beryllium.

It has been recommended that the National Stockpile ac It has been recommended that the National Stockpile acquire beryllium copper master alloy as a more readily usable raw material source. Execution of this recommendation would assure an adequate supply of this strategic alloy for defense purposes when needed and there would not again be created the surge of demand which forces commercial consumers to resort to substitutes. Furthermore, this would tend to level out the peaks and valleys of business activity which have been characteristic of the industry. There would be a consequent steadying of the demand for ore which would avoid the spasmodic, aggressive buying, in turn permitting the mining industry to beta aggressive buying, in turn permitting the mining industry to bet-ter budget its operation and expense and to plan on a prede-termined demand for beryl.

termined demand for beryl.

Because the superior properties of beryllium copper make it essential to our precision defense machinery, it is evident that many new uses of it can be made in the commercial fields. With the establishment of the adequacy and dependability of supply, many applications will undoubtedly be designed now, resulting in the diminishing of the gap between the production and consumption of beryl ore. With such developments probably in the near future, it seems unnecessary to consider any curtailnest. near future, it seems unnecessary to consider any curtailment of beryl production.

CHROME



By FAY I. BRISTOL President Oregon Mining Association Grants Pass, Oregon

Measuring the tonnage of imports against the domestic production of approximately 50,000 tons, shows the United States still almost entirely dependent on imports to supply our needs.

American Chrome Company's Mouat Mine at Nye, Mon-

tana, under a Governmearly in the fall of 1953. Government contract, came into production During 1954 one can expect domestic production to exceed

During 1954 one can expect domestic production to exceed 100,000 tons per year.

The producers of high grade chromite that are shipping their ore to the Grants Pass, Oregon, stockpile, were greatly heartened by the government's two-year extension of the buying program, and undertook considerable development work after the extension was approved on August 7, 1953. In spite of the snows in the mountains, January 1954 was one of the larger purchasing months of the Grants Pass depot. Numerous mills have finally worked out their bugs and are shipping regularly. Several producers of lump ore are keeping their roads open with a bulldozer, and maintaining shipments through the winter. In fact quite a few new properties came into production in January 1954, so we can look for a very substantial increase in high grade lump ore production in the very near future.

very near future.

As of January 2, 1954, the stockpile at Grants Pass had received and paid for 49,086 tons of high grade chrome. By February 6th they had received 52,700 tons. So, since the program for high grade chrome has been instituted, 52,700 tons has been applied against the 200,000 tons allotted for the program. With the present development it looks like the 200,000 tons will run out before the end of the program. It would be of tremendous benefit for the miners if the government accepted carload lot shipments, as over half of the chromite being purchased at Grants Pass is shipped by rail from California.

from California.

COBALT



By C. R. WHITTEMORE Chief Metallurgist Deloro Smelting & Refining Delere, Ontarie

Toward the end of 1952 indications were that the supply of cobalt would fully meet the demand. This has proved to be correct and 1953 consumption has been somewhat less than the sup-ply which would create a surplus of cobalt except for the United States Government's

surplus of cobait except for the context state states stockpile program.

Commercial uses for cobalt are increasing, but not rapidly and if military uses remain at the present level and contemplated production from Chibuluma Mines Limited, Kilembe Mines Limited, The Calera Mining Company, and Cobalt Chemicals Ltd. come into effect during the period of 1954–1956, there will be a large surplus and price reductions a valual correctation. natural expectation.

In November 1953, Cobalt metal, 97 percent Co, was increased in price \$0.20 per pound to \$2.60; cobalt oxide, 72.5–73.5 percent, increased \$0.14 per pound to \$1.96 and cobalt sulphate, 21 percent content up 7.25 cents per pound to \$0.89

pound.

The Union Minière du Haut-Katanga, the predominant producer, increased cobalt production over 1952 through the addition of a three-phase furnace of 2,160 KVA the latter part of 1952 and enlargement of its cobalt refinery at Jadotville,

1952 and enlargement of its cobalt refinery at Jadotville, Belgian Congo.

The Moroccan Bou-Azzer cobalt mine of Société Miniére de Bou-Azzer Et Du Grarra is expected to undergo technical rorganization permitting improved results. The output of metal (266 tons) at the Pombliere France plant covered French requirements and permitted exports to Japan and Austria.

The Garfield Cobalt Refinery of the Calera Mining Company went into operation December, 1952, and made the first shipment of cobalt granules in May, 1953. Output to date has not been significant due to treatment problems which have made operation, unsatisfactory. The company proposes an an-

has not been significant due to treatment problems which have made operation unsatisfactory. The company proposes an annual production of 1,650 tons of cobalt in the form of rondelles, 95 percent Cobalt, 5 percent Nickel.

Mufulira's Copper Mines Limited's copper-cobalt subsidiary, Chibuluma Mines Limited, having received additional financing from the United States Defence Materials Procurement Agency expect to commence mine production in early 1956. The DMPA loan will be repayable in metal and the United States will have a prior option on 19 percent of the cobalt output. An annual output of 16,000 long tons of copper and 500,000 pounds of cobalt is the present objective.

COBALT USES IN THE UNITED STATES

(B) Pern

	PER	CELAI	AGE	Vat			TEAR		
YEAR	A			B	E	F	6	14	
1950			27.0					13.0	0.40
1951	4.0	21.0	47.8	8.0	3.0	5.2	0.4	10.0	0.60
1952	3.1	15.5	59.2	10.3	1.2	2.8	0.78	6.5	0.62
1953	3.5	22.4	49.4	9.0	2.2	3.5	0.80	8.5	0.70



Kilembe Mines Limited, developing a copper-cobalt property near the western border of Uganda, anticipate being on a production basis during 1956, Mining of about 40,000 tons of ore a month is planned. The ore contains 1.44 to 2.09 percent copper and 0.17 to 0.19 percent cobalt from which a copper concentrate and a cobalt-pyrite concentrate will be recovered.

Ore treatment will be carried out close to the mine with copper and cobalt concentrates delivered by pipeline to metalcopper and cobalt concentrates delivered by pipeline to metallurgical plants a few miles away. The copper concentrate will be roasted and electrically smelted to blister copper. The cobalt concentrate will be treated by the roast-leach process for recovery of cobalt as oxide which will be shipped overseas (possibly Canada) for production of metallic cobalt.

Output will comprise about 18,000,000 pounds of copper and 900,000 pounds of cobalt per year.

The Deloro Smelting and Refining Co. Ltd., continues a vigorous program of modernization of cobalt plant equipment and layout at Deloro, Ontario and has 2½ years of cobalt concentrates on hand. Its precision casting division has tripled since last year and the production of cobalt-chromium-tung-sten or/molybdenum alloys is at a satisfactory level.

Cobalt Chemicals Limited, at Cobalt, Ontario, is under management by Quebec Metallurgical Industries a subsidiary of Ventures-Frobisher.

The plant will have an initial daily capacity of 15 tons of

The plant will have an initial daily capacity of 15 tons of concentrate, but is laid out to permit increasing to 30 tons daily. The products recovered will comprise cobalt, nickel, powdered copper, refined silver, and arsenic oxide. Metal alloying and fabrication are contemplated. Plant operations commenced the latter part of 1953.

menced the latter part of 1953.

Sherritt-Gordon Mines Limited have scheduled the first treatment of nickel concentrates at the Fort Saskatchewan treatment of nickel concentrates at the Fort Saskatchewan refinery for April, 1954. The pilot test plant which has passed through many changes since its inception has operated on the ultimate design for a period of six months, treating nickel concentrates containing 11 to 18 percent nickel. Recoveries are as follows: nickel 90 to 95 percent, copper 88 to 92 percent, cobalt 50 to 75 percent and sulphur 75 percent. The process is well described by F. A. Forward, the originator, in the Canadian Mining & Metallurgical Bulletin, November, 1953. 1953

Cobalt production in Canada is mostly obtained as a byproduct from the mining of nickel-copper ore by Falconbridge Nickel Mines Limited and International Nickel Company of Canada Ltd. in the Sudbury district of Ontario. As it is only within the last 2 or 3 years that modifications to the nickel recovery process have permitted higher cobalt recovery this source is assuming more importance each year.

Development of ore bodies at Cobalt and concentration of the ore in this famous Canadian silver-cobalt Camp made further progress during 1953. The La Rose property has developed ore assaying 0.95 to 2.0 percent Co and increased mill capacity to 300 tons daily. Cobalt Consolidated's Agamico mine's ore reserves assay 0.80 to 1.5 percent Co and the development of the Cobalt Lake fault group promises important tonnages of cobalt ore. Consolidation's concentration operations are to be centralized in a 1,000-Ton per day treatment plant.

It is of interest to note that Cobalt, Ontario, observed its 50th anniversary the week of July 5th, 1953.

World Production of Cobalt by Countries in 1950, 1951, 1952 and Estimated 1953 Production Measured in Short Tons

Country	1950	1951°	1952**	1953
Beigian Congo Canada Morocco (French) Northern Rhodesia United States	5,675 313 430 737	5,935 474 740 747 378	7,716 952 1,100 519 682	8,630 900 700 828 633
Total	7,155	8,283	10,969	11,691

U. S. Bureau of Mines, Minerals Yearbook, 1951. Revised estimate. Estimate.

COPPER

The year 1953 will go down in history of market-ing copper as one of strange events

At the beginning of 1953 copper was still under Gov-ernment control, both pricevise and in respect to usage.

By W. W. LYNCH Vice President Calumet & Hecla, Inc. New York, New York

The O.P.A. ceiling price for domestic copper was 24% cents per pound. Chilean copper was priced at about 36% cents delivered in the United States, Demand was such that the 30,000 tons of monthly imports from Chile were still being absorbed under the N.P.A. allocation system which permitted use of copper on the basis of 60 percent domestic and 40 percent foreign copper.

It seems obvious, however, at the year's beginning that demand was about to slacken and that Government control demand was about to slacken and that Government control was no longer necessary. It was generally believed that with dropping of Government controls and returning to a "free market" the above-mentioned fantastic range in price would shortly disappear and a more nearly common price level be reached. This assumption was a natural one because the history of "free market" conditions pointed that way. It was widely thought that the world price would settle temporarily somewhere between the O.P.A. domestic ceiling price of 24% cents and the Chilean price of 36% cents, possible around 32 cents.

With the present of increased world productive capacity.

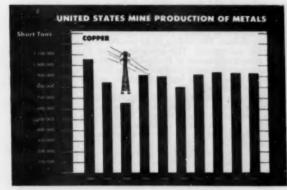
With the prospect of increased world productive capacity and a lowering of demand because of lessened needs for defense, it was also widely believed that by mid-year the price would drop well below 30 cents. It was predicted by some that by the end of 1953 the price of copper would be 25 cents or lower

Decontrol of price of copper by O.P.A. took place February 25, 1953. For several weeks confusion in copper pricing was even greater than it had been under Government control. Instead of two prices there were at least four, one major domestic producer quoting 27% cents; another, 28% cents; sill another, along with the custom refiners, 32 cents. The Chileans continued to ask 36% cents other foreign copper being offered at from 32 to 34 cents.

This confused situation, one without precedent, went on until the end of March, 1953, when some semblance of order was restored by the establishment of a price of 30 cents by most domestic producers. The Chileans, however, continued to hold their price at 36% cents. So, the anticipated return to a fairly uniform world price under "free market" conditions did not yet materialize.

To the amazement of the domestic copper industry Chile maintained its 36% cent price until near the end of 1953, piling up a stock of unsold copper generally estimated at over 125,000 tons. Chile did this in face of an apparent weakening market situation. The withholding from the market of so large a quantity of Chilean copper may be said to be the only apparent reason why the price of copper in the United States. parent reason why the price of copper in the United States stayed at about 30 cents throughout the year.

About mid-year, when the unsold stock was said to be about 85,000 tons, Chile approached the United States Government with the plan of taking this accumulation off their hands for our national stockpile. Reportedly they offered to sell this copper "at market," but apparently to them this meant a firm price of 30 cents per pound. Under market conditions wherein domestic producers would have been delighted to sell large tonnages on such a price basis, our State Department did not quickly accept Chile's offer. Moreover, there were matters of



monetary exchange rates. Chilean taxes on United States mining companies operating in Chile, future sales policy of Chile, etc., to be settled in such a deal. After months of negotiation no settlement has been reached at date of this writing (February 10, 1954).

In late December, 1953 Chile finally permitted resumption of sales in the United States of their current production at prices in line with those of domestic producers but, as stated above, not before accumulating unsold stocks said to be over 125,000 tons.

stated above, not before accumulating unsold stocks said to be over 125,000 tons.

All in all, in spite of the strange happenings described above, 1953 turned out to be a good year for the domestic copper industry. Crude production of copper in the United States (primary and secondary) amounted to 1,067,000 tons, as against 1,008,000 tons in 1952. On the basis of deliveries of refined copper to fabricators, consumption in 1953 was 1,444,000 tons, compared with 1,446,000 tons in 1952. It seems significant, however, that whereas deliveries averaged 134,000 tons per month during the first half of 1953, the average during the last half was about 107,000 tons.

With resumption of sales of Chilean copper in the United States, the question is rife at the outset of 1954 as to how much longer the 30-cent price will hold. It seems generally felt in the industry that a price drop is in the offing. However, experience of the past several years has shown that unforeseen major factors, such as the Korean war and Chile's virtual withdrawal from the market for several months can suddenly enter to upset predictions that might otherwise be sound. Consequently, forecasters in copper are presently using a great deal of caution in their predictions, and with good reason.

FLUOR SPAR



By C. O. ANDERSON President Ozark-Mahening Company Tulsa, Oklahoma

During each of the past two years I have reported that shipments of fluorspar from domestic mines have not been keeping pace with the increasing consumption. In 1951 the shipments from

In 1951 the shipments from domestic mines amounted to 347,024 tons, in 1952 the shipments dropped to 333,769 tons, and during 1953 will probably not be as much as 300,000 tons. The mines have much greater capacities for production than represented by the shipments but heavy imports are causing curtailments and shutdowns as have been so common in the lead and zinc industries and for the same reason.

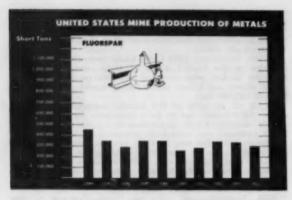
Total consumption of all grades of fluorspar continues upward, with a figure of 521,500 tons for 1952, and a corresponding figure for 1953 will be close to 600,000 tons. This increase of nearly 80,000 tons is of course a very high one percentagewise. Such a rate of increase will very likely not continue during the early future, but prospects of some increases in consumption, particularly for atomic energy uses and by the aluminum and air-conditioning industries, appear to be reasonably good.

creases in consumption, particularly for atomic energy uses and by the aluminum and air-conditioning industries, appear to be reasonably good.

Imports of 359,402 tons in 1952 were astonishing by being twice the previous record figure, which occurred in 1951. On the basis of figures available for the first 11 months of 1953 the imports for the full year of 1953 will probably exceed by a few thousand tons the record figure of 1952.

The principal countries sending imports to the United States are, in decreasing order of tonnage for the first 11 months of 1953. Mexico 178,883 tons, Italy 48,885 tons, Spain 47,093 tons, West Germany 28,242 tons, and Canada including Newfoundland 21,438 tons. The imports amount to about 60 per cent of the total consumption. The year 1953 was also the first time when the imports of acid grade fluorspar exceeded those of metallurgical and ceramic grades; the ratio was about 35 percent to 45 percent.

The imports of acid grade fluorspar increased more than 50 per cent over the figure for 1952, whereas the imports for the metallurgical and ceramic grades amounted to somewhere between 72 percent and 75 percent of those for 1952. A very pertinent fact is that the imports of the acid grade were substantially equal to the total domestic consumption of this grade, and to complete this particular part of the picture is 1BER. 1954



the fact that domestic facilities are available to furnish tonnages equal to the total domestic consumption of the acid grade.

The publicity given primarily by the United States government to fluorspar throughout the world during the past three years has resulted in the discovery of many new deposits, particularly in Mexico, and in the building of processing plants in Mexico and in both building new plants and expanding old ones in several European countries, particularly Germany, Italy and Spain. Although Mexico has been for a number of years a large shipper of fluorspar into the United States, it had practically no processing alapte fortilities but during 1952 to a large shipper of fluorspar into the United States, it had practically no processing plant facilities, but during 1953 two flotation plants of substantial producing capacity were put into operation. The shipments of the acid grade fluorspar from the European countries and from Mexico to the United States government stockpiles were substantially completed during 1953, and hence all of that tonnage as well as additional potential tonnages from new facilities will be pressing on the United States domestic market during 1954.

All consumption requirements of acid spar and substantially so of metallurgical spar on the Atlantic seaboard, are now being served by imported material, which is also beginning to invade other consuming centers in the United States. To date Mexican material has not appeared on the Atlantic seaboard, but has begun to invade nearly every other consuming locality in the United States.

Pressure from imports has resulted in the softening of the prices of all grades.

prices of all grades

The production in the western states, particularly Colorado, Nevada, New Mexico and Montana, continued during 1953, and demonstrated that considerable reserves of fluorspar are

available.

The domestic producer, whether he markets acid grade, metallurgical or ceramic grades, is feeling the heavy pressure of imports, and time can only tell whether other domestic operations, in addition to those shut down or curtailed during 1953, will be compelled to do likewise during 1954.

Consumption of all grades is edging upward, which of course is encouraging, but the struggle during 1954 will be whether imports produced in countries where wage standards are well below those obtaining in the United States will replace an increasing amount of domestic production, or whether some reasonable balance will be found between imports and domestic production, so that the domestic industry can remain in a reasonably healthy condition.

GOLD



By GEORGE O. ARGALL, JR. Mining World and World Mining

Free World output of gold declined an estimated 50,000 ounces in 1953 compared with 1952. Strikes at major Canadian gold mines, in large part, were responsible for the decline of 410,520 ounces in output in this sec-

ond major gold producing country. Notable increases in output by the Union of South Africa, Australia, Tanganyika, the Phil-

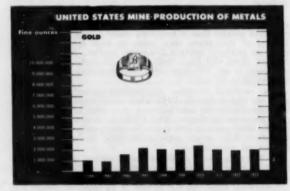
ippine Islands, Columbia, and the United States could not offset this major loss. Increased production in several important coun-tries was made at a sacrifice of ore reserves—both tonnage-wise grade-wise.

Of greatest benefit to the gold miner was the apparent passing Of greatest benefit to the gold miner was the apparent passing of the peak of supply and equipment costs in many parts of the world. This, together with the general lowering of base metal prices brought a small but distinct revival of interest in gold mining in many places as the year closed. Unfortunately this trend was not discernable in the United States.

Lowering of production cost will be of major importance in the year ahead as the increased revenue derived from Free Market sales had almost vanished by year's end. The downward trend of Free Market sales had almost vanished by year's end. The downward trend

the year ahead as the increased revenue derived from Free Market sales had almost vanished by year's end. The downward trend of Free Market value was accelerated late in the year by the sales of 4,000,000 ounces of Russian gold in the European market (largely England). The apparent reason for the Russian sales was to obtain Sterling to be used for the purchase of consumer goods. Gold bars dropped about 7 percent, and coins about 12 exceeding the price during the year.

Separating Transvaal (Union of South Africa) production from the Orange Free State (Also South Africa) and listing each separately the 10 leading gold producers in 1953 in descending separately the 10 leading gold producers in 1953 in descending order of importance were: Transvaal, Canada, United States (Including Alaska), Australia, Gold Coast, Southern Rhodesia, Philippine Islands, Mexico, Colombia, and the Orange Free State. By this method the Orange Free State surpasses the Belgian Congo, there being no other change from 1952. The greatest increase ouncewise was in the Orange Free State, up from 224,412 ounces in 1952 to 431,261 in 1953 as new mines came into production and the established mines increased tonnages. Such an increase has been closely predicted in this section of the Mining Yearbook since 1951. Orange Free State output in 1954 is forecast at 1,600,000 ounces and 2,400,000 in 1955. Notable increases were also achieved by Tanganyika to 153,-



522 ounces up from 130,851 in 1952, an increase of 94,011 ounces in Australia to 1,074,446, 37,000 in the United States, 19,000 in the Gold Coast, 15,000 in Colombia, and 14,000 in Southern Rhodesia.

The greatest decline was registered by Canada where a labor rine greatest decime was registered by Canada where a labor strike at the largest gold mines forced production down to 4,061,205 ounces from the 4,471,725 in 1952. Other declines were in the Transvaal–11,509,533 from 11,594,271 as shortage of labor and depletion of older mines was felt—in Peru, New Zealand, and Fiji.

Cealand, and Fiji.

As regular feature the gold production from each country is again listed as part of the complete report of mining in that country which appears in a later section of this Yearbook.

There was slight reduction of governmental control of sale and ownership of gold during 1953 as follows: Late in the year the Union of South Africa's treasury included fine gold bullion bars and semi-processed gold in approved non-monetary sales to any part of the world through licensed agencies providing such sales were for dollars. The ceiling of 40 percent of new mine production was maintained. The governments of Canada and Australia permitted exports of fine gold. Effective July 22, 1953 the Colombian government established the free sale of gold, thus making it possible and legal for anyone to buy and hold gold within the country.

In the United States the most important governmental action affecting gold was the hearing by a Commissioner of the United

affecting gold was the hearing by a Commissioner of the United States Court of Claims in the case to determine liability of the United States government for losses caused by War Production Board order L-208 which closed most of the gold mines in the United States and Alaska from October 1942 to July 1945.

For 1954 the outlook is for a continuance of the low premium for Free Market sales with the slackening of war possibilities which reflect in the individual's lessened demand for gold as a true hedge against war's inflation.

IRON



By Marvin A. Hustad ield Editor MINING WORLD

Iron ore production in 1953 reached an all-time high with an estimated domestic production of 119,-200,000 gross tons. This is 2,700,000 tons greater than

the steel-strike year of 1952 by 22,500,000 tons greater than that of the previous record year of 1951, and exceeds the steel-strike year of 1952 by 22,500,000 tons.

The Lake Superior District accounting for 80.6 percent of the total domestic output—96,100,000 tons—a new record. This was followed by the western states with 8,500,000 tons, the southeastern states with 7,600,000 tons, and the northeastern states with 6,200,000 tons. Minnesota continued to lead the states by producing 68 percent of the total output. Michigan was next with 11 percent, followed by Alabama which accounted for 6 percent.

An estimated value of \$800,000,000 for 1953 ore shipments also set a new record (this figure does not include transportation costs beyond the mines and benefication plants.) The total was 26 percent above the \$635,000,000 in 1951 and reflected price increases more than the larger tonnage. The average value per ton has increased from \$5.46 in 1951 to \$6.09 in 1952, and \$6.75 in 1953. This represents an increase in the last two years of approximately 24 percent.

With 29 new super-freighters, the Great Lakes ore fleet set a new tonnage record in 1953. Relatively mild weather permitted an early beginning of the season so that it was not necessary to transport any in December. This marked the first time in nine seasons that no ore was moved in that month. Iron ore imports in 1953 were estimated at 10,500,000 tons. Of this Canada, Chile, Sweden, and Venezuela each supplied about 2,000,000 tons. Liberia and Peru approached the millionton mark with the remainder coming from several other countries. Exports of iron amounted to 4,300,000 tons. Of this approximately 290,000 tons were purchased by Japan, virtually all from Nevada.

Of special interest is the increased number of iron ore benefication plants. In 1940 19 percent of Minesoton or benefication plants. In 1940 19 percent of Minesoton or benefication plants. In 1940 19 percent of Minesoton or benefication plants.

from Nevada.

Of special interest is the increased number of iron ore bene-

Of special interest is the increased number of iron ore benefication plants. In 1940 19 percent of Minnesota's ore underwent concentration in 25 plants. In 1953 this had increased to over 30 percent and was concentrated in 56 plants. In addition to the construction of new concentrating plants in the Lake Superior District, 1953 saw the beginning of the construction of the first iron ore benefication plant in the Rocky Mountain region in Wyoming.

Of prime importance in the Lake Superior District is the development in taconite concentration. Those companies actively engaged in taconite concentration are; the Oliver Iron Mining Division of the United States Steel Corporation, Erie Mining Company, and the Reserve Mining Company. All three of these companies have pilot plants for treating magnetic taconites of the eastern Mesabi Range in Minnesota. Reserve has started construction of a full-scale plant at Beaver Bay, Minnesota and late in 1953 Erie announced plans for a plant at Aurora, Minnesota that will ultimately produce 10,500,000 tons of taconite concentrate per year.

tons of taconite concentrate per year.

The world's first commercial taconite operation. A/S Sydvaranger at Kirkenes, Norway reached capacity in 1953. Norway



Mining World devoted its October 1953 issue to a complete report on Sydvaranger's operations. It was the subject of wide spread interest by taconists in the United States.

Of equal interest in the Lake Superior District are the two projects underway on the Marquette Range in Michigan for treating nonmagnetic jasper. The ore (specular hematite) will be ground to 65-mesh and then concentrated by flotation. The Humboldt Mining Company owned jointly by Cleveland-Cliffs Iron Company and the Ford Motor Company had a plant near completion at Humboldt. Cleveland-Cliffs has begun construction of a similar project at Republic.

The most important countries in addition to Norway that were active in iron ore developments outside of the United States were Canada, Venezuela, Peru, and Chile. In Canada, Steep Rock Iron Mines plans on bringing its Hogarth mine into production in 1955. Inland Steel Company through its subsidiary, Caland Ore Company is developing a mine in the Steep Rock area, production is espected in 1960. Bethlehem Mines Corporation is now developing an open pit mine and concentrating plant in southeastern Ontario. The Iron Ore Company of Canada expects to be making shipments from its Laborador deposits in 1954. From Venezuela the first shipment of ore from the Orinoco Mining Company as subsidiary of the United States Steel Corporation arrived in the United States on January 19, 1954. In Peru the Marcona Mining Company, formed by the Utah Construction Company and Cyprus Mines Corporation began production in April 1953. In Chile the Bethlehem Steel Company expects to start shipping from its El Romeral mine in 1955.

LEAD



By C. E. Schwah Manager of Industrial Relations **Bunker Hill and Sullivan Mining** & Concentrating Company Kellogg, Idaho

Events price-wise in the lead industry during 1953 followed the pattern of 1952,

followed the pattern of 1952. It was during the year 1952 when metal prices dropped 25 percent, or from 19¢ per pound at the opening to an uneasy 14½ at the close, caused by a flood of unneeded imported metal. Again in 1953, we can point to another flood of unneeded imported metal as the cause for the deplorable and critical condition in the domestic lead industry. During 1953 metal prices fluctuated through a minor price range by dropping 12½ in April and May, then returning to 13½ at the close of the year. Even this low price could not be sustained in early 1954 and by mid-February the price declined to 12½. This price is a 34 percent reduction from the OPS ceiling price established by the government at the time of hostilities in Korea.

in Korea.

Preliminary United States mine production statistics support the very obvious predictions made in view of extremely low prices. As additional final figures for 1953 become available, it appears doubtful if domestic mines will exceed the 1946 figure of 335,500 tons, which is the lowest for the period 1946 to 1952. Should final production be less than 335,500 tons, United States mine production will have dropped to its lowest level since 1935.

Hardest hit by curtailment layoffs and mine closures were

lowest level since 1935.

Hardest hit by curtailment, lay-offs, and mine closures were the Western States. This group's production dropped from an average of 19,000 tons a month in 1952 to less than 15,000 tons in last half of 1953. Largest decreases occurred in Idaho, Colorado, Utah, and Arizona.

Total United States imports of ores and metal in 1953 will amount to about 550,000 tons, compared to the record-breaking 616,000 tons in 1952. The great increase in imports has been in form of metal as 511,000 tons were received in 1952 and 385,000 tons in 1953. A similar condition occurred in late 1949 and early 1950 in the period between devaluation of foreign currencies and the Korean War. During that period excessive imports of metal drove the price down to a low of 10%.

If a reasonable economic price had prevailed, and United States mines would have been able to continue previous pro-duction, needed imports of metal would have been less than 200,000 tons. This is in contrast to the 385,000 tons actually imported. In round figures about two tons of metal were imported for every one ton actually needed for consumption. With such an excess of unneeded imported metal no price improvement could be expected in spite of almost record

The picture for United States consumption was just the opposite of the gloomy one prevailing for production. The consumption of 1,200,000 tons of lead in 1953 was near a record peak. Increased use occurred for practically all lead consuming products. Storage batteries, tetraethyl lead, and

consuming products. Storage batteries, tetraethyl lead, and cable sheathing, which account for about 60 percent of all lead consumption, showed appreciable increases over 1952. Depending on the level of general business activity, consumption in 1954 should be at a high level, although not at the 1951 and 1953 peaks, Current indications are slightly over 1,000,000 tons of consumption in 1954.

Since World War I "new" lead production has been increasing. Of great impetus to this increase has been United States governmental policy of gratituties under many Foreign Aid and purchase contract programs, the rehabilitation and modernization of old foreign properties, and the enlargement of foreign mines and plants which accounted for only small production prior to the second World War. Lead production of the world (on a smelter basis excluding secondary) steadily advanced from about 1,250,000 tons in 1946 to over 2,000,000 tons in 1952. Mid-year figures indicate that 1953 will be about equal to 1952. equal to 1952.

It is to be remembered that during this period of rising world production very substantial purchases for U. S. stockpiling absorbed large amounts of production excesses. "Scare



buying," particularly by Great Britain, during the Korean War further unrealistically absorbed some world surplus. Then three events occurred which quickly turned "alleged shortages" to an unmanageable surplus:

1. The announcement of truce talks in July 1951 and conclusion of armistice in July 1953.

2. The resumption of "free-trading" on the London Exchange in October 1952 and dumping of English stocks on the market.

the market.

Very reduced purchases for the United States stockpile

in 1952 and 1953. Immediately the world surplus production of metal flooded Immediately the world surplus production of metal flooded the United States as unneeded imports. Domestic mines were caught in the squeeze between United States wages and costs vs. cheap foreign metal, with which it was impossible to compete. Some of the 1953 world surplus was absorbed due to record United States consumption and reduction of production by closing United States mines. In any event, it is now apparent that the domestic lead mines have become the "whipping boy" and will continue to be so unless some reasonable restrictions are established to control imported pig lead at a level needed for the United States consumer.

The criers of the "have-not" theory have been proved so wrong that their silence is now ominous. It may be that they are just marking time knowing full well, as the industry also knows, that continued closure of United States mines, as imported pig lead drives the prices down, will ultimately prove their point. The United States can become "have-not" a lot quicker by closing down its lead mines (and allowing them to flood and cave) then by running out of lead ore in the very dim and distant future.

This is the reason that the lead industry in 1953, and continuing into 1954, keeps working to seek a solution for a condition which is so adverse to everyone from the producer to the consuming public and to the national welfare and safety. To do otherwise would allow "have-not" advocates to win by default.

win by default.

MAGNESIUM



By JAMES S. KIRKPATRICK The Magnesium Association New York, New York

The current "post-war" period found the magnesium industry better prepared than was the case in 1946. Most of those firms working in this lightest of all structural metals spent some effort in the past few years period in defense demand.

effort in the past few years planning for this present slack period in defense demand. Items and applications geared to civilian markets are helping magnesium hold fast to the gains made and markets developed in the bitter days of the first post-war experience. The degree to which it has been possible to hold this volume is best evidenced in the fact that during the last month of 1953—with all but one government plant out of production—total primary ingot production was 6,467 short tons, nearly 60 percent of estimated total industry capacity. Better still, production had moved upward from the 1953 low of 6,076 tons produced in September, for the third successive month.

From the production standpoint, 1953 was an excellent year

From the production standpoint, 1953 was an excellent year for magnesium. True, total production was approximately 12 percent under the amazing 1952 total of 105,821 tons, but that year was the third highest in the history of the industry. Another interesting and enlightening comparison was to be found in the fact that 1953 output was about two and a half times 1951 production and six times the volume reached

in 1950.

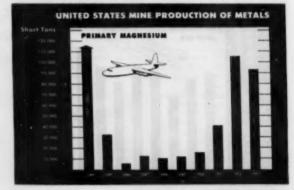
Most members of the industry considered this evidence of the effective value of the active technical and display program the effective value of the active technical and display program which has been carried on by the Magnesium Association for the past six or seven years. It was tangible evidence that industry generally was moving forward by utilizing in part at least the technology being developed and disseminated on behalf of the industry by its association. It was solid evidence that the inherent values present in magnesium were being understood and utilized to a degree which assured future markets if the technology was backed by selling effort.

From the Military Establishment as primary buyer in a war economy, consumers and products essentially used for normal business demands became of top importance. This time the change-over was neither so sudden nor so complete as in 1945-1946. At that time the pattern was to discontinue the manufacture of all items which even savored of defense. In doing that magnesium working and many similar industries

manufacture of all items which even savored of defense. In doing that magnesium working and many similar industries were momentarily closed down. Present thinking is more realistic and those products which are necessary to maintaining the defenses of the country are still in demand though in limited quantities and with less immediate urgency.

According to figures issued by the federal government, shipments of castings and of wrought products held at or near the 1952 levels despite the loss of large defense orders in the last half of 1953. In the case of neither castings nor wrought products was there a critical drop in shipments although it is true that there were evidences of a change-over period at a lower level while new business was taking its place on production books. duction books.

Patterns of uses by industry of magnesium have undergone little change in the past year. Aviation and the aluminum industry continue to be major users of the product with ma-



terials handling and the various phases of ground transportation currently developing fastest. However, there is every reason to believe that increases in product demand will evidence extended, as well as new, areas of use in 1954. Possibly the most promising future market for the product, though it may never become a major user of tonnage, is the graphic arts. Here new developments have recently been announced by Dow Chemical Comany and it is known that other developments still in experimental stages give great promise of new techniques in an industry which has seen few basic changes in its long history. in its long history

in its long history.

Magnesium finds itself in an enviable position insofar as supply is concerned. With world economy and national economies focussed on limited availability and potential exhaustion of basic supplies of most raw materials, magnesium still has as a selling point—unlimited and assured supply. So long as there is sea water there is magnesium—to the tune of 6,000,000 tons for each cubic mile of sea water.

is sea water there is magnesium—to the tune of 6,000,000 tons for each cubic mile of sea water.

Major developments in the field of supply were two. First, and as mentioned before, all government-owned production facilities except the Valasco, Texas plant operated in conjunction with the Freeport plant of Dow Chemical Company have been withdrawn from operation. Secondly, during the year Dow brought nearer to completion the concentration of its magnesium processing and fabricating facilities at Madison, Illinois. Fundamentally price has had little influence on the industry in the year just closed. A minor upward revision in price which approximated 10 percent had little effect for it reflected general price increases.

price increases.

MANGANESE



By F. A. McGONIGLE Vice President and General Manager Manganese, Inc. Henderson, Nevada

startling realization that only 7 percent of the United States requirements for manganese, indispensable

to the production of steel, is domestically produced, and that the other 93 percent is imported from far flung formatic accordance to the precarious situation of both our basic accordance.

imported from far flung foreign sources, emphasizes the precarious situation of both our
basic economy and defense program.

Production data show a 50 percent increase (95,000 to
145,000 long tons estimated) in domestic manganese during
1953, and some progress is reported in mine development and
metallurgical research. Nevertheless, if steel production is to
become less dependent upon foreign ores, prompt action must
be taken to accelerate production of metallurgical grade manganese from low-grade domestic ores.

The estimated 1953 net supply was approximately 3,245,000
long tons of plus-42 percent Mn ore, but only 145,000 long tons
of this amount represented domestic production. Consumption
of 2,250,000 long tons left only about 995,000 long tons; an
inventory equivalent to less than five months' supply.

Our critical manganese predicament was forcefully portrayed
in 1948 when Russia abruptly suspended shipments of ore to
this country, but we were successful in increasing production
from other foreign sources by loans and grants, and the condition was eased. Then in 1952 the government established a
domestic stockpiling program in four depots to accumulate
18,000,000 long ton units of manganese in 15 percent Mn or
better grade ore. Under a nationwide program 19,000,000 long
ton units in 40 percent minimum-grade ore would be purchased.

Accumulation of ore in 1953 at the four government stock-

chased.

Accumulation of ore in 1953 at the four government stockpiles as shown in the included tabulation was low, but indications are that the Wenden, Arizona, allotments may be filled this year; that Deming, New Mexico, will attain its quota before the program expiration date of June, 1958, and that Butte-Philipsburg, Montana, and the nationwide programs will expire

unfilled.

Over 98 percent of the known manganese is contained in deposits of large low-grade character, the most important of which are at Chamberlain, South Dakota (1.5 percent Mn); Cuyuna Range, Minnesota (2 to 10 percent Mn); Aroostook County, Maine (7 to 11 percent Mn), and Artillery Peak, Arizona (4 to 6% percent Mn). The low percentages of these ores preclude them from being of commercial importance until one or more of the chemical processes now being tried reaches

the point where it can be regarded as proven for the production of metallurgical grade manganese. The urgency for the development of processes of this type cannot be over-emphasized. It is encouraging to note that a few companies with government assistance, and also the U. S. Bureau of Mines are working on these lowered open and the control of the c

velopment of processes of this type cannot be over-emphasized. It is encouraging to note that a few companies with government assistance, and also the U. S. Bureau of Mines are working on these low-grade ores.

Another potential source is the manganese remaining in open hearth slags. Estimates are that upwards of 11,000,000 tons of this slag containing over 700,000 tons of manganese are produced annually. The U. S. Bureau of Mines for some time has been conducting experiments on pyro-metallurgical extraction of manganese from these discarded slags. One private concern with government assistance is also working on the problem.

The principal source of supply to date of foreign ore has been India, furnishing about 40 percent of the tonnage; next is the Gold Coast at around 17 percent; Cuba yields 12 percent; Union of South Africa follows with 11 percent; the Belgian-Congo ships some 6 percent; with Mexico at about the same figure; Brazil contributes 4 percent, with other world countries supplying the remaining 4 percent.

It is obvious that domestic ores can not be produced to compete pricewise with foreign ores, and in order to be effective, the government's stockpiling and buying program had to establish higher rates for domestic producers. The rate paid for 15 percent ore at Deming and Wenden was \$8.54 per long dry ton, and went up to \$88.00 per long dry ton for 40 percent ore, with deductions for treatment and other items. Butte ore prices for 18 percent Mn started at \$4.87 per long dry ton and at Philipsburg the buying rate was \$6.43 per long dry ton and at Philipsburg the buying rate was \$6.49 per long dry ton of 15 percent Mn. A different price schedule, of course, was applied to the nationwide program, with a base price of \$2.30 per unit for 48 percent ore, with premiums and penalties and certain freight cost concessions. Imported ores, on the other hand, were quoted early in 1953 as high as \$1.20 per l.t.u., c.i.i., U. S. ports, duty extra, basis 46 to 48 percent Mn. In the last few months demand for the

to this threat is to start now on a realistic program to develop

our own manganese deposits.

In summary, we feel that this program can be accomplished

United States Government Manganese Purchases,

	By Depots,			
Depot	Long Ton Units Purchased	Long Ton Units Authorized	Percentage of Authorization Purchased	
Deming, N.M. Wenden, Arizona Butte-Philipsburg.	789,618 2,089,283	6,000,000 6,000,000	13.16 34.82	
Montana.	428,809	6,000,000	7.15	
Sub-total Carload	3,307,710 557,252	18,000,000 19,000,000	18.38 2.93	
Totals	3,864,962	37,000,000	10.45	

(1) Establishing a tariff of at least 5¢ a pound on contained metallic manganese instead of the existing negligible ¼¢ per pound:

(2) Revising the stockpile price structure so that domestic producers would receive \$1.00 a unit above today's world price. This would have the effect of adding about 60¢ a ton to the cost of steel, but with only about half of the entire steel production involved, the net effect would be an increased cost of 30¢ per ton for steel;

(3) Use in the steel industry of lower grade manganese ores containing higher percentages of iron and silica;
(4) Revising the Deming and Wenden stockpile programs authorizing each to acquire a minimum of 15,000,000 recoverable units as based on amenability tests. This amount of plus-20-percent ore would warrant a 500-ton mill to operate over a five-year period;

(5) Changing the Butte-Philipsburg depots' schedule to purchase 6,000,000 recoverable long ton units;
(6) Establishing a depot in Virginia to stockpile 6,000,000 recoverable long ton units. This depot, we understand, is being seriously considered by the government; and

(7) An accelerated metallurgical research program by the S. Bureau of Mines on the low-grade domestic ores, as well as on the stockpile ores.

MERCUR Y



By J. ELDON GILBERT Manager Cordero Mining Company Palo Alto, California

The year 1953 was an uncertain one for mercury producers. With consump-tion as high as in any year since the war (about 50,000 flasks) and with domestic production of only about

13,900, imports were so available to consumers that the price dropped \$20.00 per flask, from \$205.00 in January to \$185.00 in December.

During the latter part of the year, it was rumored, the United States Government purchased 70,000 to 75,000 flasks from foreign producers. While the bulk of this probably came from Spain and Italy, about 10,000 flasks are reported to have been purchased from communist Yugoslavia. Domestic pro-ducers were not invited to bid on these transactions. Probably all of the metal purchased by the Government went into the

all of the metal purchased by the Government went into the strategic metal stockpile.

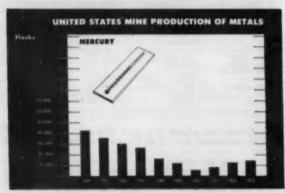
While these purchases have probably held some mercury off the market and thus helped support the price, no one in industry knows when buying for stockpiling will stop and a great flood of foreign metal be dumped on the domestic market with a resulting low price which will force the domestic mines to close to

tic mines to close.

The economics of mercury production and the serious The economics of mercury production and the serious condition of the industry does not seem to be understood by the "experts" in Washington. On October 23, 1953 Mr. Charles H. Johnson, Chief of the Base Metal Branch of the United States Bureau of Mines, testifying before a Congressional sub-committee, stated, "I think at the present time there is a fair price for mercury." This statement was absurd in the light of last year's mercury mining business. It is almost certain the industry as a whole lost money and it is highly doubtful if a single major producer in the entire United States made appreciably more than expenses.

made appreciably more than expenses.

In the face of these depressing economic conditions there is no expansion of the industry by private capital. Prospectors and small investors have long since turned their attention away from mercury prospects to properties with minerals which have a more stable market and price.



During 1953 the DMEA program was used by some miners During 1993 the DMEA program was used by some miners in their search for ore. Among the mines and companies assisted were New Idria Mining and Chemical Company, San Benito County, California, California, Quicksilver Mines, Inc's Abbott Mine in Lake County, California, and Bonanza Oil Mines Corporation in Oregon. Most of the production for 1953 Mines Corporation in Oregon. Most of the production for 1953 came from the above three mines plus that from the Sordero Mining Company's mine in Nevada, Hermes Mine of United Mercury Mines Company in Idaho, and Sonoma Quicksilver Mines in Sonoma County, California.

If the Government continues to buy for stockpiling the mercury picture for 1954 will probably not change much from that of 1953. Consumption should be at about the same rate, production might increase a little, and the difference would be imported.

At this time 75 percent of domestic consumption is taken

At this time 75 percent of domestic consumption is taken care of by imports. These imports so completely dominate the mercury market that the price is wholly determined by the

foreign producers. Should the mine operators of Spain, Italy and Yugoslavia decide to raise the price there should be little increase in domestic production unless the price rose to the vicinity of \$275.00 to \$300.00 per flask.

MOLYBDENUM

The large increase in production and the resultant release of molybdenum from domestic allocation were the

By C. M. LOEB, JR. Vice President Climax Molybdenum Company New York, N. Y.

1953 highlights in the molybdenum industry. Molybdenum was released from alloca-

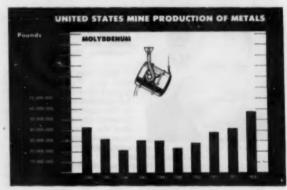
molybdenum industry. Molybdenum was released from allocation on July 1st.

Estimated 1953 United States production of molybdenum is approximately 57,000,000 pounds. This compares with the 1952 production of 42,000,000 pounds. This increase resulted from the addition of facilities and the development of large broken ore reserves at the mine of the Climax Molybdenum Company at Climax, Colorado.

The Climax mine continued to be the largest producer of molybdenum, although substantial quantities were produced from porphyry copper mining and milling operations in Utah, Arizona and Nevada. Some molybdenum was also produced in New Mexico and California.

The estimated United States consumption of molybdenum during the year was approximately 30,000,000 pounds compared

The estimated United States consumption of molybdenum during the year was approximately 30,000,000 pounds compared with approximately 28,000,000 pounds in 1952. The iron and steel industry continued to be the largest consumer, although the markets in other fields, such as for paints, pigments and catalysts continued to grow. The use of this material in the field of agriculture and as a lubricant is small, but interesting.



It is expected that such uses will increase substantially during

It is expected that such uses will increase substantially during the next few years.

The recently completed additional facilities at Climax increase the country's 1954 production capacity to about 65,000,000 pounds per year.

The facilities of the molybdenum industry should be more than adequate to meet all the demands which might arise from the expanding iron, steel, engineering and chemical industries of the Free World in the foreseeable future. In the event of a future substantial growth in the demand for molybdenum, such as might be created by the development of new large-scale uses, the resources of the Climax mine make nossible further substantial production capacity increases. possible further substantial production capacity increases.

NICKEL



By A. E. Roberts Field Editor MINING WORLD

Nickel production in 1953 was a record high, and 1954 production schedules should boost the nickel output even higher. The United States Government decontrolled the metal on November 1, 1953, but conceded that the supply

was not expected to meet the demand for some time.

Falconbridge Nickel Mines, Ltd., Canada's second largest nickel producer, also negotiated a contract during the year with the United States' DMPA. It will deliver between 100,-000,000 and 200,000,00 pounds of nickel by June 1962. The third furnace at the smelter was completed in the fall of 1953 to handle the output of Falconbridge's new Hardy mine. Two shafts are being sunk on the Fecunis Lake property as part of the \$42,000,000 expansion program.

The United States Covernment owned Nicaro project in

The United States Government owned Nicaro project in Cuba is studying a proposal to sharply increase nickel production. Output was a record 27,687,966 pounds in 1953. The Freeport Sulphur Company is planning development of its nickel ore body at Moa Bay, Cuba and estimates the production could be as high as 30,000,000 pounds of nickel annually.

New Caledonia produced a record 34,120,000 pounds of nickel in 1953. The Societe Le Nickel in the Thio area on the East Coast is New Caledonia's largest nickel producer and delivers the majority of its output to the United States Government steeleristics.

delivers the majority of its output to the United States Government stockpile.

Production is scheduled to start at Hanna Nickel Smelting Company's Nickel Mountain project near Riddle, Oregon in the summer of 1954. The completed plant will have four primary furnaces and five electric furnaces for the production of 54 tons per day of ferronickel. Stipping operations for the open pit mine are under way. Hanna Coal and Ore Company is developing the nickel project at an estimated cost of \$4,300,000. The DMPA is advancing Hanna Nickel Smelting about \$24,800,000 for construction of smelting facilities.

International Nickel Company of Canada Ltd., World's largest nickel producer, announced in June 1953 that it had negotiated a contract with the Defense Materials Procurement Agency. Under the terms of this contract, INCO will deliver a total of 120,000,000 pounds of metallic nickel over a period

a total of 120,000,000 pounds of metallic nickel over a period of five years ending in 1958.

OIL SHALE



By BOYD GUTHRIE Oil-Shale Demonstration Bureau U.S. Bureau of Mines Rifle, Colorado

Industrial concerns played increased interest in oil shale during 1953. This interest is reflected in such activities as the purchase of shale lands by several com-panies and the cooperative

engineering and research work performed on oil shale and shale

engineering and research work performed on oil shale and shale oil by an ever-growing number of companies under formal agreement with the U. S. Bureau of Mines. Approximately 100 private companies, educational and research institutions, and individuals have participated in the cooperative program since its inception. Over 3,000 tons of oil shale and 1,200 barrels of shale oil and refined products have been furnished by the Bureau for investigative studies. The nature of the research work has varied—from retorting and refining experiments to testing shale oil for its herbicidal and therapeutic properties.

The oil-shale mine at Rifle was changed from a three-level to a two-level system during 1952. The top, or advance, heading is 39 feet high and the lower level, or bench, is 34 feet high, giving a vertical section of 73 feet. Average grade of shale is the same when mining is done from either level, thus eliminating a blending operation at the retort. A room-and-pillar method is being followed, with 60-foot openings and 60-foot pillars. Stope, or area extraction is 75 percent of the total shale. Research work on rotary drilling and development of specialized equipment continued in 1953, with good results. Vertical rotary-drilling technique has been advanced to the degree where it may be used for the bench or lower level, and development of horizontal rotary drilling for use in the and development of horizontal rotary drilling for use in the top heading is progressing rapidly. Due to savings in drill steel, higher drilling speeds, and other advantages, preliminary estimates show that commercial oil-shale mining costs may be decreased 40 percent by the use of rotary instead of percussion

During 1953 major emphasis at Rifle was on operation of the 150-ton-per-day gas-combustion retort. Although the re-tort was constructed by the end of 1952, the shale storage and charging equipment necessary for its continuous operation remained to be completed in 1953. Using manual methods where needed for charging, the retort was first operated June 29, 1953, before the storage and charging facilities were completed. Results from preliminary operation of the experimental plant have been most encouraging, and minor alterations are resulting in improved performance. Although only shakedown operation was possible during 1953, work in 1954 will be directed toward complete evaluation of the performance characteristics of the preserve. acteristics of the process.

PERLITE





By E. P. CHAPMAN, JR. and JOHN A. WOOD Mining Engineers and Geologists, Albuquerque, New Mexico

The perlite industry continued to set new records for produc

The perlite industry continued to set new records for production of ore and expanded material in 1953.

Total sales of crude perlite from mines and sizing plants are estimated at 189,000 tons with a value of \$1,000,000. Total production of expanded perlite in the United States increased nearly 15 percent to about 178,000 tons valued at \$9,000,000.

During 1953 Great Lakes Carbon Corporation, which has operated an ore sizing plant at Socorro, New Mexico since 1949, acquired the deposits and sizing plant facilities near Florence, Colorado formerly owned by AleXitE Engineering Division of the Alexander Film Company.

At Klondike, California a new sizing plant was erected and put into operation by the California Perlite Corporation. Situated on U.S. Highway 66 and served by the Santa Fe Railroad, this plant has a capacity of 20 tons per hour of sized ore of several gradations.

Currently nearly 90 percent of expanded material is marked.

several gradations.

Currently nearly 90 percent of expanded material is marketed in the building industries for use in lightweight, fire retardant plaster and insulating concrete. Perlite has now been recognized as an ideal plaster aggregate by all of the major gypsum companies, who are distributing mill-mixed perlite and gypsum for plaster. Some gypsum producers have their own perlite processing plants, while others continue to purchase expanded material from independent manufacturers.

Increased sales were reported for special grades of expanded perlite used as molding sands in foundries; for several types of loose-fill insulation; as filter aids in various industries; and as acoustic aggregate.

acoustic aggregate.

Research on the development of new uses continues at an

accelerated pace.

A nationwide certification and labelling program for perlite plaster aggregate was launched by The Perlite Institute in June, plaster aggregate was launched by The Perlite Institute in June, 1953. Under this program participating manufacturers are licensed to use on their product packages a copyrighted seal which guarantees conformance to ASTM Revised Specification C 35-53 T. This certification program has resulted in greater emphasis on quality control by miners and expanders and is greatly increasing consumer confidence in the product. Two new specifications for perlite concrete and perlite concrete roof fill were also established by the Institute.

The Perlite Institute, comprising nearly 50 member companies, retained the following officers for the year: president, Lewis Lloyd, Alatex Construction Service, Inc., New Orleans,

Growth Of Perlite Industry From 1947 to 1953

Vear		ite Sold and sde Producers Value	Expanded Peritie Sold Short Tons Value			
19471	10,450	\$ 58,000	7,700	8 271,000		
19481	22,100	134,000	18,600	742,000		
19491	71,100	510,000	52,200	2,385,000		
19501	101,536	649,162	86,962	4,741,38		
19511	153,502	858,099	133,175	7,243,291		
19521	164,845	873,054	154,563	7,997,73		
19532	189,000	1,000,000	178,000	9,000,00		

Figures for 1947-52 from U.S. Bureau of Mines, Mineral Industry Surveys, MM2 No. 2100, revised Dec., 1953. Estimate of The Perlite Institute.

Louisiana; vice-president, J. C. Kingsbury, F. E. Schundler Company, Joliet, Illinois; and secretary-treasurer, Richard L. Davis, The Perlite Institute, 10 East 40th St., New York 16. Directors, in addition to the above, are: K. C. Bercaw, Great Lakes Carbon Corporation; Kirk E. Hazelton, Cleveland Gypsum Company; B. S. Howell, Jr., Tennessee Products Company; Neal D. Snyder, Combined Metals Reduction Company; and T. C. Ward, Jr., Perlite Manufacturing Company.

Reserves of perlite ore in seven western states are conservatively estimated to be in excess of 300,000,000 tons of which about half is glassy ore and half pumiceous type material. There is obviously no possibility that the United States can be classed as a "have-not" nation with respect to PERLITE.

PHOSPHATE



By G. DONALD EMIGH Director of Mining, Inorganic Chemicals Division Monsanto Chemical Company St. Louis, Missouri

Phosphate ore in the United States is mined for two general uses: fertilizer and chemicals. Six states conand chemicals. Six states con-tributed practically all do-mestic production, and in order of importance are as Idaho, Montana, Wyoming and

order of importance are as follows; Florida, Tennessee, Idaho, Montana, Wyoming and Utah.

The fertilizer industry uses high-grade material both as concentrates and high-grade ore. Most of the industry is based on treating this material with sulfuric acid to produce super-phosphate (16 to 20 percent available PsOs), triple-super phosphate, (45 to 50 percent available PsOs), and phosphoric acid (up to 53 percent PsOs). A relatively small part of the production of ore or concentrates is ground and is used directly on "acid" soils.

Approximately 27,000,000 short tons of ore were mined for the industry in 1953. About 4 percent of this was in Idaho, Montana and Wyoming, 4 percent in Tennessee, and 92 percent in Florida. Most of the Florida and Tennessee ore is lower in grade than the Western ore, and is therefore beneficiated into washed and flotation concentrates.

Total United States production of high-grade ore and concentrates in 1953 was about 12,600,000 short tons—perhaps a 10 percent increase over 1952. The states of Idaho, Montana, and Wyoming contributed about 9 percent of this production; Tennessee 4 percent, and Florida 87 percent.

In past years Western fertilizer ore mined has been high-grade enough not to require beneficiation; however, in 1953 two producers were milling part of their ore—Anaconda Copper Mining Company, by wet washing at their mine and mill at Conda, Idaho, and San Francisco Chemical by dry methods at their Leefe mine near Sage, Wyoming.

Anaconda Copper Mining Company increased their production at their Conda, Idaho mine. The major part of their ore was produced underground, but surface mining, started in 1953, was stepped up in 1953. Most of the surface ore and part of the underground ore, is washed to up-grade. Ore and concentrates are shipped to Anaconda, Montana for processing into treble-super and phosphoric acid fertilizers.

During 1953 Montana Phosphate Products Company, a subsidiary of Consolidated Mining and Smelting Company, continued underground mining phosphate ore in th

super-phosphate fertilizer.

San Francisco Chemical Company conducted two mining and milling operations in 1953. One is at the Leefe mine near and miling operations of the company also operated a new mill beneficiating lower grade ores by dry methods. Mining is on the surface. Part of the operation's production is pulverized and sold for direct soil application and part is disposed of to industry for further processing into fertilizers. One such receiving company is Stauffer Chemical Company in California. The other San Francisco Chemical Company operation is the Waterloo mine near Montpelier, Idaho, re-opened in is the Waterloo mine near Montpelier, Idaho, re-opened in 1952 and producing high-grade ore by surface mining. The

ore is dried and pulverized in a new mill at Montpelier, and sold for direct soil application. Underground development work was carried on at Waterloo mine in 1953 anticipating underground mining.

underground mining.

Western Phosphates, Inc., an affiliate of Stauffer Chemical Company, American Smelting and Refining Company, and Kennecott Copper Corporation, continued in 1953 construction on their new fertilizer plant at Garfield, Utah. Plant operation began early in 1954. Ore will be supplied by San Francisco Chemical Company, Montpelier, Idaho.

In Utah there were two new mine developments in 1953; San Francisco Chemical Company, underground, and J. R. Simplot Company, surface. Both are in the Crawford Mountains near Randolph.

Western Fertilizer Association, a group of farm Coops from

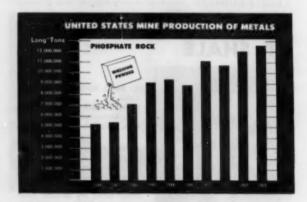
tains near Randolph.

Western Fertilizer Association, a group of farm Co-ops from the Pacific northwest, continued to indicate interest in 1953 in fertilizer production from their Dry Valley property east of Soda Springs, Idaho. In 1952 this concern acquired a plant site at Soda Springs, and that year did some underground and surface mine development.

During 1953 Central Farmers Fertilizer Company, a group of mid-West farm Co-ops, did underground and surface mine development at their Georgetown Canyon property near Georgetown, Idaho. Plant site and railroad surveys were made and the company anticipates production of ore for fertilizer plants in the mid-West, or of fertilizer at the mine produced by electric furnace methods. electric furnace methods.

by electric furnace methods.

Phosphate ore is processed into phosphate chemicals through phosphoric acid produced in two ways: by burning elemental phosphorus obtained by smelting and reducing the ore in the electric furnace, and by sulfuric acid treatment of the ore. There is some use for elemental phosphorus as such in munitions, but this quantity in normal times is relatively small.



In 1953 about 50 percent of the elemental phosphorus used in chemicals was made into sodium phosphates going into the detergent soap industry. The remainder went largely into such uses as; animal feed, water treatment (softening) compounds, foods, dentifrices, petroleum industry and plasticizers.

About 83 percent of the phosphorus used as elemental or as chemicals was produced by the electric furnace.

as chemicals was produced by the electric furnace.

In 1953 there were nine concerns in production of elemental phosphorus, with a connected power load of about 458,000 K.W.H. One of the nine concerns is government owned, T.V.A. in Tennessee, Its production goes into fertilizer but production from the other eight is largely used in the chemical industry. Total elemental phosphorus production by private industry in the United States in 1953 was about 440,000,000 pounds. Idaho and Montana produced 36 percent, Tennessee 48 percent and other Eastern and Southern states 16 percent. In 1953 a new furnace operation began in Tennessee with

In 1953 a new furnace operation began in Tennessee with

Shea Chemical Company at Columbia, Tennessee.

The eight companies referred to above used about 3,250,-000 tons of ore in 1953. Over 90 percent of this tonnage was

The three largest producers of elemental phosphorus are Monsanto Chemical Company, Victor Chemical Works, and Westvaco Chemical Division of Food Machinery and Chemical Company, Victor Chemical Division of Food Machinery and Chemical Chem

cal Corporation. The first two companies operate both in Tennessee and the West; Westvaco operates in the West. The Western electric furnace industry began in 1949 with Westvaco at Pocatello, Idaho, followed by Victor at Silver Bow, Montana, and Monsanto at Soda Springs, Idaho. A further expansion of this new Western industry will take place ther expansion of this new Western industry will take place in 1954 with Monsanto putting another furnace into operation at Soda Springs.

POTASH



By A. NORMAN INTO Vice President International Minerals & Chemical Corporation Chicago, Illinois

New all-time potash pro-duction records were made in 1953, in spite of some falling off in the production rate during the latter part of the year. Output of the

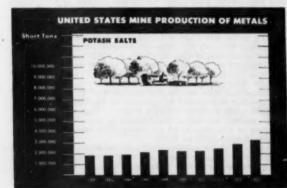
ducers in 1953 is estimated to be 3,300,000 tons of salts equivalent to 1,900,000 tons of K₂O, compared with a corresponding figure of 1,665,000 tons of K₂O in 1952, which was the previous high. The five mines and refineries in the Carls-New Mexico basin accounted for roughly 90 percent of the total.

In July, 1952, the Defense Production Administration in the setting of goals for critical materials established a figure of 2,185,000 tons of K₂O by 1955, to meet the expanded needs of agriculture and industry. The advent of two new major operations in the Carlsbad field since that time, as well as increment increases by the older operations, has gone a long way in meeting the Government's goal. As of the year's end, installed capacity appears sufficient to meet the country's essential needs for the near future, at least.

Due to the severe drought which gripped most of the nation last summer and fall, the normal use by consumers slackened materially. This, combined with a growing tendency for fertilizer mixers to defer deliveries to the heavy consuming months in late winter and spring has resulted in a serious build-up of inventory at the mines, it being estimated that as of the beginning of 1954, upwards of 400,000 tons of salts are in storage warehouses in Carlsbad and other areas. Accelerated deliveries continuing through the spring months should reduce these stocks to a normal figure.

As in the United States, production in the European producing centers has reached new heights. It is estimated that world capacity now exceeds world requirements by upwards of 1,000,000 annual tons of K_sO . The impact of this situation is the increased pressure to move heavier tonnages into the United States, While domestic prices remained unchanged during the past year, sales by the European producers have been at lowered prices, with some cargoes sold by Russian-controlled East German producers at prices, which, if continued, could be destructive to the United States industry.

tinued, could be destructive to the United States industry. During 1953, exploration in the interest of discovering and delineating unknown ore bodies has gone on at a high rate. In the Carlsbad Basin International Minerals & Chemical Corporation announced the discovery of a large sylvite ore body, and its plan to commence shaft-sinking in the near future. The Freeport Sulphur Company was granted a lease on a large acreage of Federal lands containing large ore reserves, which properties they are evaluating with the possibility of exploitation in the near future. The known reserves of potash ore in the Carlsbad Basin are continually expanding. With drilling programs by others still proceeding at an intensive pace, it would appear that no fears can be entertained over the possibility of exhaustion within the next several generations.



Technological advances are continually being made by all companies. In operations of this type, mining constitutes the major portion of total production costs of finished products. A number of Continuous Miners were delivered during the year, as well as Jumbo drills, and other cost-saving equipment. Improvements in the further efficient mechanization of the mines is being continuously sought because of the extremely high wages for labor. The take-home pay of the miners in the Carlsbad Basin is the highest of the entire mining industry. The outlook for 1954 cannot be clearly envisioned at this juncture. With falling farm income, the deliveries of fertilizer, which consumes up to 90 percent of domestic production, is expected to decline some 5 to 10 percent from 1953. No accurate estimate can be made of imports from France, East Germany, West Germany and Spain, as the price structure on imports is not stable. The Russian program on prices and tonnages to be made available in the spring months is unpredictable.

Against this, is a more positive note, that being the increas-

unpredictable. Against this, is a more positive note, that being the increasing usage of potash salts in mixed fertilizers and for direct application to the soil. It is significant that the K₈O content in mixed fertilizers which hovered in the range of 6% to 7% percent during the second World War, has climbed to an estimated 10 percent of K₈O in 1953. Therefore, a slight falling off of fertilizer sales may not necessarily mean a reduction in the total K₈O moving into agriculture.

SILVER



By HENRY L. DAY Day Mines, Inc. Wallace, Idahe

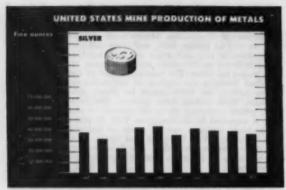
Silver has three kinds of uses, in the arts, by industry and for government coinage. The monetary factor removes silver, at least partially, from the economic law of supply and demand. Governments

and demand. Governments may purchase unusual amounts for coinage, or melt extraordinary quantities of coins for silver bullion sales, and even change their laws with respect to monetary usage. Thus in any one year consumption or supply may be raised or lowered by other than normal circumstances. During the past five years world demand has outrun the mine output of silver something like 40,000,000 ounces annually. This deficiency has been supplied at times by drawing upon the monetary stocks of several nations; chiefly the Treasury of the United States has been the largest and most noted seller from its stock of "free" silver. The Bank of Mexico has been both a buyer and seller, and its operations in recent years have been the greatest single stabilizing influence upon the world price of silver. This bank's action was in duite large measure the cause for silver fluctuating in the New York quotation range only from 80¢ to 90¢ per ounce in the three years 1951, 1952 and 1953.

With these considerations in wind it is continued.

With these considerations in mind it is possible to hazard a guess as to the immediate future of the silver market. Last year the New York quotations for silver, reflections of the world price, the New York quotations for silver, reflections of the world price, rose from 83% to 85% in January and remained at the latter figure through December. This was indeed an extraordinary small change for a 12-month period, and again is a manifestation of the stabilization policy of the Bank of Mexico, adjusting its sales and purchases to changing conditions. With a firm market for the metal and decreased production expected this year, it is still not thought that the price will go above 91¢ in 1954, as the supply of "free silver" in the United States Treasury becomes available at about that price. Last year the Treasury's supply of free silver declined 28,700,000 ounces to 50,400,000 ounces on December 31st. Even without the return of any borrowed "lend-lease" silver to the U. S. free stock account, which is not expected for possibly another three years, the Treasury's supply of free metal will not be exhausted much before the end of 1955 (at 91¢ per ounce) assuming the present rate of withdrawal continues.

Demand and supply are not expected to vary greatly in 1954 from the figures of last year. Any change may be predicted to be slightly downward in respect to demand and still a little more downward with respect to supply. Such a combination of circumstances should tend toward a firm price. The included tabulation shows the estimated production and consumption of



silver on a world basis in 1953. These figures should be of special significance to North and South Americans, as silver is very largely an industry of the Western Hemisphere.

Outside of the Western Hemisphere, Australia with 11,000,000 ounces and Japan at 7,000,000 ounces were the two principal silver producing countries. Also outside this hemisphere, the arts and industries of Germany and Great Britain gave those two countries the lead in consumption in 1953 with 18,000,000 and 12,000,000 ounces, respectively. It will be noted from the tabulation that the world outside of the two Americas is roughly self-sufficient.

self-sufficient.

Silver which was "lend-leased" by the United States in World War II, has become returnable in April, 1957, five years after the Japanese Peace Treaty was signed. The total is 410,500,000 ounces, of which India and Pakistan owe 226,000,000 ounces, the United Kingdom 88,100,000 and The Netherlands 56,700,000 ounces, respectively. It is anticipated that all this silver will be repaid to the United States Treasury as the debtor nations now appear to have the ability to do so within the next three years. Under the Silver Purchase Act 55 percent of the silver returned (225,800,000 ounces) would be monetized, and the remaining 45 percent (184,700,000 ounces) would be placed in Treasury's free stocks. As there is a possibility of the utilization of other methods of returning lend-lease silver placing it entirely into the free classification, Senator McCarran of Nevada warns the producers to be aware that an effort of such nature may be expected and they should be on guard against it.

Last year a number of developments of interest to silver miners occurred. First in February the OPS removed all controls on the metal; this action caused no market change as silver was

miners occurred. First in February the OPS removed all controls on the metal; this action caused no market change as silver was below the ceiling price of 90.5¢ per ounce. Then in July Senator McCarran introduced a new bill, S. 2514, providing for a return to the bi-metallic standard. Almost simultaneously Senator Bush of Connecticut introduced a bill, S. 2555, to repeal all silver purchase acts. No action was taken by the Senate with respect to either measure. World-wide, England in two purchases consummated in September and December obtained 21,500,000 ounces of silver from Russia. Also in the latter month England allowed her essential industry to purchase silver bullion from "dollar" areas. In mid-summer Japan sold 3,000,000 ounces which presumably went into Bank of England stocks. It may be inferred that the Old Lady of Threadneedle Street is preparing to meet its country's lend-lease repayment obligation.

obligation.
Industrial consumption continued to increase much faster in the United States than did use by the arts. Industry is now using three times the quantity required prior to the outbreak of World War II. The over-all tendency throughout the industrialized countries of the world is for an increase in silver consumption, Japan, for example, used about 5,000,000 ounces last year for photographic purposes.

During 1954 the mine production of the world may be ex-

Production and Consumption of Silver In Leading Countries During 1953

roduction*	l'ercentage Change from 1952			Total
38 45 30 32	(-5) (-10) (+19) (+2)	105 2 4	43 14 .4	148 16 8
e 145	(-1)	111	61	172
60	(-3)	53	14	67
205	(-2)	164	75	239
	38 45 30 32 e 145 60	Change Change From 1952	Change	Arts & Consumption* Change Arts & Consumption*

Production and consumption measured in millions of ounces.

Small, not available. United States coinage includes 5,000,000 ounces
minted for Cuba.

pected to decline modestly, as silver associated with lead will not be produced at the same rate as in 1953 due to the relatively unattractive price of lead which is expected to remain low for a number of months. On the other hand, all three kinds

low for a number of months. On the other hand, all three kinds of users of silver appear to need amounts comparable to the past year. Accordingly, the price may be expected to remain firm, possibly increasing several cents per ounce. It may be repeated that a ceiling of 91¢ is likely to be manifest as about at that price United States Treasury free stocks are available to consumers. The monetary factor on a worldwide basis is not expected to operate sufficiently to influence price movements much more in 1954 than in 1953.

Senator McCarran, the great and active champion of silver, continues to urge the producers to insist that the Treasury live up to the spirit of the Silver Purchase Act of 1934, continuing to buy silver to the fullest extent intended when this law was enacted. He points out the Treasury stopped purchasing silver in 1942 on the open market (1) without having acquired by value one-third of the value of the gold stocks, or (2) had seen the price reach \$1.29 per ounce. Since 1942 the Treasury has offered only \$0.35 per ounce for foreign silver, which offer has been of no actual significance in recent years.

SULPHUR



By JOHN C. CARRINGTON Vice President Freeport Sulphur Company New York, New York

Production at high levels and continued expansion of productive facilities marked activity in the United States sulphur industry in 1953.

sulphur industry in 1953.

The estimated output of sulphur in all forms was approximately 6,254,000 long tons compared with 6,274,000 tons in 1952 and 6,197,000 tons in 1951. Frasch-process sulphur from the salt dome deposits of Louisiana and Texas accounted for 5,155,000 long tons as against 5,293,000 tons in 1952 and 5,278,000 tons in 1951.

Sulphur from non-Frasch sources continued to increase. Production totaled an estimated 1,099,000 long tons compared with 981,000 tons in 1952 and 919,000 tons in 1951. The 1953 output from these sources is estimated as follows: other elemental, 340,000 tons; from pyrites, 434,000 tons; from gases, 325,000 tons.

tons.

The high rate of Frasch sulphur production was matched by an equally high demand that kept supply and demand in close balance throughout the year. In fact, shipments exceeded production by approximately 75,000 tons, necessitating a corresponding reduction in stockpiles at the mines. At the end of the year, these stocks totaled 2,755,000 tons, an amount slightly higher than stocks on hand in 1951.

Although exports of United States sulphur declined somewhat, the free world demand for United States sulphur remained at a high rate. Exports to Canada, Great Britain, France, Australia and other countries amounted to an estimated 1,268,000 long tons.

000 long tons.

Two additional Frasch-process mines, Garden Island Bay in Louisiana and Damon Mound in Texas, were placed in operation late in 1953. Early in 1954, Nash dome, also in Texas, went into production. This raised to 13 the number' of Gulf Coast mines in production, the largest at any time in the industry's

history.

The full effect of the newest productive facilities are just beginning to be felt. Carden Island Bay, near the mouth of the Mississippi River, is the largest sulphur development since the start of production at Grande Ecaille in 1933. Initial production was obtained on November 19, 1953 and by mid-February of this year (1954) the mine was operating at its projected rate of 500,000 long tons per year.

Damon and Nash are located southwest of Houston. A small mining plant was placed in operation at Damon on November 11, 1953 while initial production began at Nash on February 4, 1954. Another salt dome development is being undertaken by Freeport at Chacahoula in Louisiana. This mine is scheduled for completion early in 1955.

Projects to obtain sulphur from sources other than salt domes

Projects to obtain sulphur from sources other than salt domes continued to expand. There are now more than 60 projects which recover the mineral from gases, utilize pyrites, mine surface deposits of sulphur, or obtain sulphur as sulphuric acid from the sulphur dioxide of smelter gases.



By ROBERT J. NEKERVIS Supervisor, Metallurgical Tin Research Institute, Inc. Columbus, Ohio

The situation of the tin industry at the beginning of 1954 seems not only to be as harsh and difficult as it was in the early 1930's, but there are even more imponderables to worry about.

The tin miner, in his own industry, is faced with the problem of uneconomic prices in the face of greatly increased costs; of a continuing excess of production since 1948; and of stockpiles which are vastly greater than they were in the peak year of

which are vastly greater than they were in the peak year of 1931.

Above and beyond these problems, there remains the future trend of industrial activity to be considered. Owing to stringent conservation measures, tin was left out in the cold in the huge war and post war industrial expansion of the principal consumer, the United States. Consumption of tin last year in the United States will be down some 15 percent from what it was in 1939.

This was the situation which confronted representatives of the tin-producing and consuming countries at the United Nations Tin Conference held at Geneva, Switzerland from November 16 to December 9, 1953. A plan for regulated supplies and prices was prepared, and this so-called International Tin Agreement of 1953 will be submitted to the representative countries. It is too early to assess the results of all this. On January 26, 1954, the Malayan Federation Government reported that two-thirds of the tin miners favored the proposed International Tin Agreement.

The price of tin went into a tailspin at the end of March, 1953, dropping about a third—some \$0.40 per pound from the \$1.218 R.F.C. selling price which prevailed during the first part of 1953. It reached a low of 78.25 cents in June, then continued upward slightly through the last six months of the year. The average price in New York for the first two weeks in January, 1954 was 84.85 cents per pound.

Since it is customary to chart United States mine production in these annual Mining Yearbook Metals and Minerals Reviews.

Since it is customary to chart United States mine production in these annual Mining Yearbook Metals and Minerals Reviews, should be pointed out again that there is no tin mined in the

it should be pointed out again that there is no tin mined in the United States.

The chief producing countries in order of their productivity last year were Malaya, Indonesia, Bolivia, The Belgian Congo, Nigeria, and Thailand, The internal situation in each of these countries during 1953 was as follows:

Malaya produced some 56,000 long tons of tin for the 12-month period ending November 30, 1953. The drastic fall in price in 1953 has affected the smaller Chinese owned mines. Many of them were closed. Even so, production was maintained at the same level as 1952. at the same level as 1952.

The general situation in Malaya, after five years of jungle warfare, has seen great improvement in 1953. This is good news as far as prospecting is concerned. Future production is vitally

wartare, has seen great improvement in 1993. This is good news as far as prospecting is concerned. Future production is vitally dependent on prespecting operations for new areas.

Indonesia produced 33,753 long tons of tin in 1953 as against 35,003 tons in 1952. Prospects for tin production in 1954 are complicated by political and economic difficulties which have arisen in that country throughout 1953.

Bolivia exported some 33,917 long tons of tin for the 12-month period ending November 30, 1953, as against 31,950 tons for 1952. Since the nationalization of the mines in October, 1952, it is difficult to obtain a very accurate picture of the situation in that country. It is clear from export figures, however, that production remains at a high level.

The Belgian Congo's output for the 12-month period ending November 30, 1953 was 15,733 long tons, up somewhat from the 13,798 tons produced in 1952. Remarkable results have been achieved under a comprehensive research and prospecting program undertaken by all the mines in the Congo and Ruanda Urundi. Most important has been the exploration of the Geomines 'hard pegmatite' deposits at Manono, where, according to reports, proved reserves can be measured in hundreds of thousands of tons, the largest addition made to the world tin reserves in years. The Congo also has its share of troubles which are the result of an uneconomic tin price.

Nigeria produced 8, 278, long tons, of tin during the 12-month.

reserves in years. The Congo also has its share of troubles which are the result of an uneconomic tin price.

Nigeria produced 8,278 long tons of tin during the 12-month period ending November 30, 1953 as compared with 8,315 tons in 1952. During the war years, Nigeria sacrificed the higher grade ground. Even so, the output since has remained steady in spite of a continuing fall in the tin content of the ground being mined. The present level of tin prices has not had as drastic an

effect in Nigeria, as elsewhere, because a number of Nigerian tin producers are also producers of columbite. The present prices of this metal compensated for the fall in tin prices.

Thailand produced some 10,000 tons of tin for the 12-month period ending November 30, 1953. Its production has been between 9,000 and 10,000 tons for the past three years and is not likely to change in 1954.

tween 9,000 and 10,000 tons for the past three years and is not likely to change in 1954.

In conclusion, it should be pointed out that one of the reasons for the continued production of tin in the face of falling prices is that most of the tin mined in the world comes from economically-underdeveloped areas where there are few alternate sources of employment. As a result, the governments of these areas are heavily dependent on tin for revenues, and it is produced at uneconomic price levels.

TITANIUM



By P. W. ALLEN Plant Manager MacIntyre Development National Lead Company Tahawus, New York

While titanium metal received great public notice and was the subject of much discussion, titanium pigment manufacture and necessary raw materials were by far the

most important phase of the titanium industry in 1953. Production of titanium pigments reached a record level, although the output of domestic ilmenite reached a record level, although the output of domestic illneinted decreased to about 456,000 gross tons because of the suspension of activity at one mining operation. Imports of illneinte from India decreased to about 135,000 gross tons, but there was a sharp increase in the titaniferous slag available from Canada. Most of the Canadian slag production, 130,000 gross tons, was taken by customers in the United States. Domestic production and imports of theorite or slag therefore textled about 720,000.

Most of the Canadian slag production, 130,000 gross tons, was taken by customers in the United States. Domestic production and imports of ilmenite, or slag, therefore totalled about 720,000 gross tons which contained in the order of 400,000 tons of TiOs. The MacIntyre Development of the National Lead Company at Tahawus, New York, reached a record output of 278,000 gross tons of ilmenite. The same operation yielded nearly twice that tonnage of magnetite concentrate which was sintered and sold to the iron and steel industry.

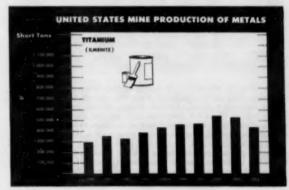
The du Pont Company's operations at Starke, Florida, are believed to have maintained previous production rates. It was announced during the year that \$3,000,000 would be invested to obtain another 100,000 tons per year of ilmenite and titanium mineral concentrates near Lawtey, Florida. The new operation will be in the northward extension of the Trail Ridge formation being worked at Starke. The Humphreys Gold Corporation will build and operate the new plant for duPont as they have at Starke.

Humphreys Gold Corporation also continued to operate the beach sand deposits of the Rutile Mining Company at Jackson-ville, Florida, producing ilmenite, rutile, zircon and monazite at about the same rates as 1952. The American Cyanamid Company continued to produce ilmenite at Piney River, Virginia, but the Glidden Company's mine in North Carolina was inactive during 1953.

The Ouehec Irom and Titanium Company reported that if

inactive during 1953.

The Quebec Iron and Titanium Company reported that it mined 102,000 gross tons of ore at its Allard Lake property



near Havre St. Pierre, the ore containing more than 88 percent of combined titanium and iron oxides. Five electric arc furnaces at Sorel operated throughout the year to an extent which made possible the shipment of 130,000 gross tons of slag containing 70 percent equivalent TiO_b. Most of the slag went to the United States for titanium pigment production, but considerable research was done by some customers on chlorinating the slag as a step toward obtaining titanium metal. Norwegian ilmenite production was somewhat higher in 1953; all of it was used in European pigment plants.

Titanium metal continued to attract recurrent flurries of public attention throughout the year, and a great many research organizations and military groups were involved in detailed technical studies to adapt this new structural metal to numerous high-priority applications for the most part in the area of aircraft and guided missiles. Actual titanium sponge production was estimated by the United States Bureau of Mines at 2,241 net tons for the 12 months, about double the output for 1952. The two major producers were Titanium Metals Corporation of America (jointly owned by National Lead Company and Allegheny Ludlum Steel Corporation), the world's only fully-integrated enterprise, and the duPont Co., which sold its sponge to three different melters and fabricators. Both these companies were able to get many exaperating production problems well in hand during the year, and metal quality so improved so as to support the requirements of the very best high-strength alloys. A newcomer, Cramet (the Crane Company), announced production plans late in the year, the plant location being at Chattanooga, Tennessee, with initial sponge deliveries scheduled for late 1954.

TUNGSTEN



By Worthen Bradley President **Bradley Mining Company** ian Francisco, California

The world price of tung-sten (ores and concentrates) declined sharply in 1953. But tungsten mines in the United States, and some in foreign lands, were encouraged to continue-and even

aged to continue—and even expand—production by virtue of special price contracts with the United States government. Domestic producers received a real boost when Congress voted, and the President signed (in early August, 1953), extension of the General Services Administration domestic tungsten buying program. More on this, below.

The accompanying table, with figures in short ton units of WO₃ (as are all tungsten figures herein, to coincide with the GSA manner of reporting), shows the domestic trends.

Tungsten Production, Imports, Consumption, and Stocks in Short Ton Units For 1952 and 1953

Period	Domestic Mine Production (a)	Imparts for Consumption (b)	Total Supply (a) + (b)	Consump-	Total Industry Stocks at End of Period
(9 months) Year	388,620 566,800	1,352,760	1,741,380	395,280	247,140
Average Quarterly	141,300	450,920	580,460	131,760	209,400
1952 Year	430,100	1,098,762	1,528,362	544,320	190,680
Average Quarterly	107,525	274,691	382,216	136,080	165,420

The fact of about-face in consumption, after years of steady advance, was more significant than the size of the drop itself.

On the other hand, United States official buying actually increased, as the GSA program took up the slack. During the first half of 1953, GSA purchased more than twice the amount it had acquired during the prior year and a half of the program's operation; and by the last half of 1953, practically all domestic production was being sold to GSA and not to industry. This contrasts sharply with the expectation in May, 1951—when the program was inaugurated—that the government would not be obliged to absorb appreciable quantities of tung-

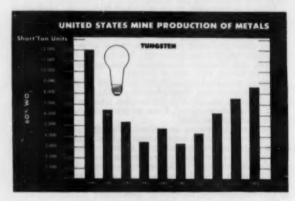
sten. It was confidently believed that the essential requirements of industry and for the military supporting programs were far in excess of anticipated production totals. Signs of the over-optimism of these beliefs began to appear in 1952. It was all the more gratifying to domestic producers, then, that the GSA program was extended to July 1, 1958 (as mentioned above). The program will terminate earlier if the 3,000,000 short ton unit purchase goal is reached prior to that time.

The bill extending the expiration date also provided for the publication of regular quarterly reports on GSA purchasing. This very helpful feature (helpful in the sense that it aids domestic producers in the timing of further expansion, etc.), revealed that purchases to the end of 1953 totalled slightly less than 600,000 units. If this were also the annual rate of less than 600,000 units. If this were also the annual rate of domestic production for the next few years, and assuming that all of it went to GSA, the objective would be achieved by the end of 1957. But offsetting factors will probably operate to temper this estimate. For instance, industry is likely to need some of the higher quality domestic concentrates; and the working out of older deposits may more than balance the opening of new mines. opening of new mines.

As the end date approaches, there may be two rather un-As the end date approaches, there may be two rather unsatisfactory developments. For one thing, many properties will probably "rob" their higher grade ore bodies, a practice usually considered detrimental to future mining. And there may well be attempts to slip foreign material in on the domestic program. Recent history indicates that high tungsten prices do not always bring out the best aspects of human character, the things chould establish the ne relaying of the inspection feaso there should certainly be no relaxing of the inspection fea-

so there should certainly be no relaxing of the inspection features of the program.

North Carolina's Hamme mine of Tungsten Mining Corporation was first in production in 1953, and was followed by United States Vanadium Company's Pine Creek mine in southeastern California. The latter is a likely leader of the 1954 field. Both these properties were being developed by 1,500 foot shafts. Among other operators (in 11 states and in Alaska), two Idaho properties deserve mention. The Ima mine, in the eastern part of the state, reached a peak in annual production, And the Springfield property—a deposit in a central Idaho talus—had a productive summer, and is expected to have at least one more such season. A Salt Lake City chemical plant started custom treatment of ores and concentrates. Eastern interests invested heavily in Nevada's Black Rock and Lincoln Mines. Some of the leading producers organized The



Tungsten Institute, with headquarters in Washington, D. C. In general, 1953's increased production was derived largely from mine development and plant expansion completed in 1952. Much less of this type work was undertaken in 1953. The import figure probably reached its peak in 1953, and can be expected to recede from now on. Many foreign properties, fortunate enough to have had United States sales contracts, will be forced to shut down as these contracts expire (the Korean contract, for instance, will expire in 1954; and it will be interesting to watch the government's policy on this matter). It can be assumed that the price f.o.b. New York is below the cost of production at the average foreign property. It is known, for example, that Portugese production has already been cut rather sharply.

Growing consumption in metal powder, in carbide, and in

ready been cut rather sharply.

Growing consumption in metal powder, in carbide, and in miscellaneous uses, have more than offset the decline in ferrotungsten and in steel. In 1941 the domestic uses in powder, etc., were only 5 percent of total consumption; by 1952 they had shot up to 70 percent. These uses require tungsten concentrates of higher specifications than average, all of which probably means that there will be more and more processing of concentrates in chemical treatment plants.

URANIUM



By WILLIAM J. WAYLETT Special Assistant to the Director, Division of Raw Materials United States Atomic Energy Washington, D. C.

In the uranium mining industry, the year 1953 wit-nessed many significant de-velopments and was charac-terized by the discovery of

large tonnage ore bodies. Where formerly there were only a few known large ore bodies on the Colorado Plateau, today well over a dozen large tonnage ore bodies exist. In addition to important new ore discoveries, ore production moved to record heights,

large tonnage ore bodies. Where formerly there were only a few known large ore bodies on the Colorado Plateau, today well over a dozen large tonnage ore bodies exist. In addition to important new ore discoveries, ore production moved to record heights, new ore processing facilities were placed in operation, and new exploration techniques were developed and widely employed. Probably the greatest interest was generated in the remarkable developments in the Big Indian Wash district of San Juan County, Utah. Located 20 miles southeast of Moab, Utah, this district in a year's time has become one of the most important single uranium mining areas in the United States. Following the initial discovery of uranium in the area in 1952, by Charles A. Steen, an independent geologist, he area was assaulted by prospectors and company geologists, resulting in extensive claim staking, the discovery of additional ore bordies, and the development of large reserves of uranium on the Chinle formation, hitherto unproductive, when his drill penetrated 14 feet of high-grade uraninite ore on his Mi Vida claim. The first ore shipment was made early in 1953 and by December he had shipped over \$,2,400,000 worth of ore. The average grade of the material was 1945, and 1945, an

Many old established mining operations continued to operate and furnished a steady supply of ore. Some of these are Bronson and Cooper's Happy Jack mine near White Canyon, Utah; Consolidated Uranium Mines' operations at Temple Mountain, Utah; the Navajo Uranium Division of Kerr-McGee Oil Industries and other operators in the Lukachukai Mountains of Arizona; and numerous small operators in the Uravan Belt of Colorado and in the Grants, New Mexico area. Over 525 uranium mining enterprises, ranging from one- or two-man operations to large scale operations employing dozens of men, were active during the year contributing to the record ore production.

With respect to primary-vein types of uranium deposits, only the Marysvale, Utah area is consistently producing ore. The Freedom and Prospector mines, owned by the Vanadium Corporation of America, accounted for most of the production during 1953. VCA has completed its three-compartment, centrally located shaft, through which the Freedom and Prospector are being worked. Elsewhere, investigation and exploration of mines in the Colorado Front Range and Boulder Batholith area of Montana has proved disappointing, although minor production of ore occurred in both areas.

The development of large reserves of uranium on the Colorado Prost Range and Roustwarian on the Colorado Roustwarian on the Colorado Range and Roustwarian on the Colorado Roustwarian on

in the Colorado Front Range and Boulder Batholith area of Montana has proved disappointing, although minor production of ore occurred in both areas.

The development of large reserves of uranium on the Colorado Plateau has pointed up the necessity of constructing processing plants in the particular areas in which the reserves are located. These are Moab, Utah, to treat the Big Indian Wash ores; Bedrock, Colorado, to treat the Jo Dandy ores; and Grants, New Mexico, to treat the Jackpile ores. Plans are being developed for the new plants at Moab and Bedrock, and the Anaconda Copper Mining Company is planning to construct additional facilities at its Bluewater plant, completed in August 1953 near Grants, to treat the Jackpile and other ores of that area.

Plans are also being developed for a mill at White Canyon, Utah, to replace the experimental plant operated by Vanadium Corporation of America for several years at Hite, Utah. In the meantime, the Commission is planning to set up ore-buying and sampling depots at Moab, White Canyon, and Bedrock to provide a close market for the ore produced in these areas and to build up a stockpile for the planned plants.

In addition to considering these facilities, the Commission also is planning to oduble the capacity of its mill at Monticello, Utah, which the Galigher Company operates, and several of the private mills are planning to enlarge their plants. Ground was broken early in 1953 for the new processing plant at Shiprock, New Mexico, by Kerr-McGee Oil Industries to handle the ores from the Lukachukai and Carrizo districts of Arizona.

Airborne radiometric survey techniques were used more extensively during 1953 than in the two previous years. Scintillation counters mounted in small aircraft flying slowly at low altitudes pick up areas of anomalous radioactivity, which are checked by field parties, and a number of important uranium mineral occurrences have been found in this manner; in fact, a high percentage of the ore produced to date in the Black Hills area originall

Copper Mining Company, and numerous others. Wider use of this effective means of prospecting broad areas may be expected in the coming year.

Outside the United States, the Belgian Congo, Canada, and South Africa produced uranium for the free world. In the Congo, the famous Shinkolebwe mine continues to be a major source and in South Africa a number of plants now are producing uranium as a by-product of the Witwatersrand gold operations. Additional plants are scheduled to go into operation in 1954. In Canada, production from the Beaverlodge operation of Eldorado Mining and Hefining Company, Limited, on Lake Athabaska, now is augmenting production from the Eldorado mine on Great Bear Lake.

Also, in the Lake Athabaska area, the Gunnar Gold Mines Limited's pitchblende deposit is being explored completely by drilling and indications are that the deposit may be the most important yet developed on the continent. Another important uranium discovery is being investigated in the Blind River area of Ontario, on the north shore of Lake Huron. Found in April 1953 by Pronto Uranium Mines Ltd., the ore occurs in a conglomerate bed at the base of the Mississagi quartzite and more than 70 miles of outcrop is being intensively explored by a large number of companies which have acquired ground in the area. Pronto and Algom Uranium Mines Ltd. already have blocked out by drilling large tonnages of low grade but easily mined ore. Algom also is drilling a uranium occurrence found lately in the Ouirke Lake area of eastern Ontario.

Australia will be added during 1954 to the list of countries producing uranium for the free world. The Radium Hill mine in South Australia is being developed and the mine shaft was over 500 feet deep at the end of 1953. A concentrating plant is under construction at Port Pirie to treat the Radium Hill product.

The second plant in the United States to recover uranium as a by-product of phosphoric acid and phosphatic fertilizer pro-

duction was completed in October by Texas City Chemicals, Inc., at Texas City, Texas. Two other plants for the same purpose under construction by International Minerals & Chemicals Corporation and Virginia-Carolina Chemical Corporation are nearing completion in Florida. Raw material for all these plants is the lower layer of the Bone Valley formation in Florida which contains small quantities of uranium.

Looking ahead to 1954 the most urgent need in the domestic uranium program is the construction of additional ore processing facilities on the Colorado Plateau to accommodate the ore which will be produced from the newly developed resources. An immediate market must be provided for the ore producers during the construction period, and, as mentioned, the AEC is moving to set up ore buying depots in several areas to fill this need. The increased tempo of exploration, both by Government and by private interests, may be expected to result in further discoveries of uranium mineralization, with a resultant increase in total uranium ore reserves sufficient to more than offset the anticipated substantial increase in the production of uranium ore.

ZINC



By OTTO HERRES Vice President Combined Metals Reduction Company Sait Lake City, Utah

The zinc mining industry of the United States experi

of the United States experienced very rough going in 1953. At a time when the country was enjoying the greatest boom in its history the lead-zinc mines were struggling to survive a flood of low-priced imports which threatened their very existence and converted many once-thriving communities into deserted areas.

The year opened with the

The year opened with the price of Prime Western Zinc, East St. Louis, at 13 cents per pound on January 2, down 6% cents from the Government ceiling price of 19% cents which prevailed until June 2, 1952. The price dropped steadily throughout the year to 10 cents on September 11 and 9% cents shortly after the close of the year.

In consequence of the drastic price cut of over 50 percent in a year and a half, mines were forced to close, smelters curtailed production, losses mounted and unemployment increased throughout the year. Inconsistent as it may seem, the mining industry faced disaster at a time when the consumption of zinc and zinc products was at the highest level ever known in the United States.

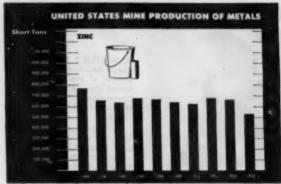
and zinc products was at the highest level ever known in the United States.

Slab zinc consumption in 1953 was at an all-time high of about 1,000,000 tons, but imports of zinc in ores, concentrates and metal also reached a new high of some 755,000 tons while United States mine production was dropping to the lowest level since 1938 at 534,730 tons.

Virtually the entire lead-zinc mining industry of the United States fought a strenuous battle throughout the year for protection against the imports that threatened the industry with destruction. In the emergency caused by the excessive imports a National Committee was formed representing all lead-zinc mining districts in the United States. The Committee in conference at Denver, Colorado, early in 1953, concluded that constructive legislation was needed for the preservation of the industry. It was recognized that to a certain extent imports are needed, but in the world of today it cannot be considered wise to take excessive imports at the expense of a crippled mining industry.

Imports of zinc in ore and metals in June amounted to 84,257 tons and in July to 85,212 tons. By comparison United States consumption of zinc metal in June was 85,859 tons and in July, 73,031 tons. Enough zinc was imported to close down every lead-zinc mine in the country. Foreign zinc was offered on the East Coast at around 9 cents per pound in October, at which figure smelting charges and freight leave no cash return for the mines, whether foreign or domestic, at today's cost of mining.

Approximately 315,000 tons of foreign lead and 300,000 tons of zinc imports ordinarily are sufficient to supplement supplies from domestic sources if protection is afforded to maintain a healthy mining industry in this country. During 1953, some 755,000 tons of zinc were imported, more than twice our needs.



Virtually the entire lead-zinc mining industry of the United States with the exception of companies engaged in foreign mining activities presented positive and indisputable evidence to the Tariff Commission in a hearing held in Washington, D. C., November 3 to 6, 1953, to show conclusively that the mines of this country have been seriously injured and smelters have been forced to curtail their operations because foreign lead and zinc are flooding our markets at less than the cost of domestic production. That the mines were suffering serious injury was unquestioned. The facts were clear and were freely acknowledged by all appearing before the Commission. The question for the Commission to decide became not whether the mines were injured but rather what steps should be taken to preserve an industry important to national defense and essential to the civilian economy. Only partial relief is afforded by the limited increase in duties which is possible under the existing law.

No testimony whatever was presented to the Commission that

economy. Only partial relief is afforded by the limited increase in duties which is possible under the existing law.

No testimony whatever was presented to the Commission that denied the serious injury sustained by the lead-zinc industry and its workers. All who testified recognized the need for relief to the mines but differed in their suggested remedies.

Concerned over the evidence of serious injury, the Committee on Finance of the United States Senate on July 27, 1953, and the Committee on Ways and Means of the House of Representatives on July 29, 1953, each by unanimous resolution requested the Tariff Commission to institute a general investigation of the domestic lead and zinc industries, including the effect of imports of lead and zinc on the livelihood of American workers. Testimony in this investigation was heard by the Tariff Commission concurrently with the "escape clause" investigation requested by the industry. Results of the investigation must be reported to the Committees on or before March 31, 1954.

And on October 26, 1953, the President expressed concern over "depressed conditions within numerous metal mining districts" of the nation in setting up a special cabinet committee to determine how the U. S. can maintain sufficient raw materials to meet "any contingency during the uncertain years ahead." No tangible evidence of this concern, however, became visible. Expressed of authors of sumpretsy and higher of expression of sumpretsy and higher of expression of sumpretsy and higher of expression and pairly and the sum of the pression of the pairly and the property and pairly and the property and pairly and the property and pairly and pairly and pairly of authors of sumpretsy and hights of expression areas and pairly
meet "any contingency during the uncertain years ahead." No tangible evidence of this concern, however, became visible. Expressions of sympathy and hints of subsidies were heard, neither of which seemed a likely cure for excessive imports.

Is it in the public interest to permit an industry which is the largest of its kind in the world, and which is essential to national defense and security, to be priced out of existence by a flood of foreign lead and zinc offered at less than the cost of domestic production? The President has stated that a strong domestic mining industry is vital to national security and the continued prosperity of the country, but other than appointing a committee to study the problem he has taken no action thus far [March 1954] toward that end.

Zine Supplies for the United States in Short Tons

Item	1951	1952	19531	
Mine production	681,000	666,000	540,000	
Imports, ores	303,000	449,000	520,000	
Total	984,000	1,115,000	1,060,000	
Ore used for oxide	116,000	91,000		
Ore for smelting	868,000	1,024,000	950,000	
Smelter production	882,000	904,000	940,000	
Imports, slab zinc	88,000	115,000	230,000	
Slab zinc supply	970,000	1,019,000	1,170,000	
Consumption	934,000	852,000	975,000	
Exports	36,500	57,700	18,000	
Apparent surplus	-500	109,300	177,000	

Slab Zinc Stocks at December 31, 1953 were: At producers' plants 180,620 tons; at consumers' plants 90,000 tons (Est.); and from the commodity exchange warehouse report 15,718 tons. These from the commed 286,338 tons.



ALASKA

Gold and Coal Pace Alaskan **Production To Post-War Peak**

The estimated Alaskan mineral production for 1953 is valued at \$27,890, 000, a six percent increase over the 1952 value of \$26,284,000. The increase for 1953 was again due to the expansion of the coal mining industry which produced 850,000 tons-again an all-time highamounting to a 24 percent increase over the 1952 figure. Increased coal production was from practically the same mines as those operating in 1952, resulting from more efficient operations and increased volume from strip mines. The anticipated demand for coal in 1954 is slightly over 1.000,000 tons

Gold production amounted to an estimated 273,479 ounces, 14 percent above the 1952 production. It is believed, how-ever, that some of this reported produc-tion may be a hold-over from the previ-ous season. Gold still manages to remain the most important mineral produced in Alaska, followed closely by sand and gravel, and coal, in total value of output. The remaining metals in order of importance are platinum, tin, silver, tungsten, mercury and lead.

Adverse economic conditions and the "fixed" price for gold forced additional small placer operations to close during the year. Again, only one small gold lode mine was active throughout the year, although some intermittent operations are conducted in connection with assessment work on gold lode claims. Prospecting activities were directed primarily toward the search for base and strategic metals, including radioactive minerals. At the close of the year, two radioactive mineral discoveries had been reported which appear to have commercial possibilities.

Defense Minerals Exploration Admin-

istration loans totaling \$207,000 were approved for the following operations: tin on the Seward Peninsula, platinum near Goodnews Bay, and mercury in the Kus-kokwim River Valley.

The major activities throughout the Territory were as follows:

Southeastern Alaska Activities were concentrated on copper-nickel, iron and antimony deposits in Alaska's "panhandle." Exploration of Admiralty-Alaska Gold Mining Company's nickel-coppercobalt property at Funter Bay continued with very favorable results. The Yakobi Island nickel-copper deposits, staked by Canadian interests last year, have been under litigation in the courts as the result of action brought by former claim holders.

An option on the Klukwan iron de-posit, formerly held by Japanese interests, has been picked up by a Canadian group who did considerable exploratory work on the deposit and obtained large samples for metallurgical testing. The Snettisham iron deposit was diamond drilled by the U. S. Bureau of Mines. Explora-tion of the Camaano Point antimony mine

tion of the Camaano Point antimony mine of the Tillicum Mining Company was continued with DMEA assistance. South Central Alaska Kenai Chrome Company blocked out ore and made preparations to begin delivery of chromite under government contract in 1954. The Seldovia Chrome Company made new discoveries in the area and plan an early test shipment of chromite in the spring of 1954 A field party, representing Kentest shipment of chromite in the spring of 1954. A field party, representing Kennecott Copper Corporation, spent the summer in the Nabesna Valley, concentrating on the copper-molybdenum deposit at Orange Hill. An interesting copper deposit was staked near the head of the McClaren River not far from the proposed route of the Paxson-McKinley Park Highway. Road construction to the west of Paxson has uncovered important conof Paxson has uncovered important copper mineralization.

per mineralization.

A new industry, the manufacture of building materials, was started by Basic Building Products, Inc., at Anchorage. Plant construction was begun and initial products will be fire and face brick, terra cotta and various types of tile.

The first actual drilling in exploration for oil by private interests since 1940 was initiated in the Nelchina District by

Alaska Oil and Gas Development Com-pany. Kerr-McGee Industries landed all

pany. Kerr-McGee Industries landed all the necessary equipment and prepared the site for its first hole in the Yakataga District under the agreement with Phillips Petroleum Company.

Yukon Basin The United States Smelting Refining and Mining Company continued to operate six gold dredges in the Fairbanks District, and began stripping operations in a new area for the first time; i.e., near Chicken in the Forty-Mile District. The Goodnews Bay Mining Company continued to be the major United States producer of platinum with its operations near Goodnews Bay. The its operations near Goodnews Bay. The DeCoursey Mountain Mining Company continued exploration of the Red Devil continued exploration of the Red Devil and DeCoursey Mountain mercury de-posits, and were producing mercury from the Red Devil property at the end of the year. Exploration of the well known Stampede antimony deposits in the Kan-tishna District was continued by Earl Pilgrom.

Seward Peninsula Three gold dredges were again operated by the Nome Division of the U.S.S.R.&M. Co. Exploration of the U.S.S.R.&M. Co. Exploration of the Lost River lode tin mine of the U.S. Tin Corporation continued. A year-around water supply was developed, and equipment installed. The mill was operated intermittently, and flow sheet equipment installed. The mill was operated intermittently, and flow sheet changes made as well as additional equipment installed to increase capacity. Zenda Gold Mining Company continued drilling of its Cape Nome placer tin holdings with encouraging results. The Alaska Tin Corporation began exploration of a virgin tin property at Ear Mountain in the northern part of the Seward Peninsula. Northern Tin Company was the only actual shipper of tin, the production coming from the Buck Creek placer operation. eration.

Production of Gold, Silver, Lead, Tin Mercury, Coal, Sand and Gravel in Alaska from 1945 through 1953

		METALS				NON MINE METALLICS FUI			
Year	Ounces Gold	Ounces Silver	Tons Lead Shart	Tons Tin Long	Flasks Mercury	Sand & Tons Gravel Short	Coal Short Tons		
1945	68,117	9,983	11	-			300,000		
1946	226,781	41,793	115	etner	699		366,800		
1947	279,988	66,150	- 264	1	127		349,000		
1948	248,395	67,341	329	5	100		407,900		
1949	229,416	36,056	51	51	100		433,500		
1950	289,272	52,638	149	79	energy.	3.050,000	412,500		
1951	239,637	32,870	21	69	alone.	6,818,000	495,000		
1952	240,557	32.986	1	79	28	10,782,000	686.000		
1953**	273,479	39,111	16	50	35	10,700,000	850,000		

· Not available

ARIZONA

Pima Is Major Copper Discovery; Four New Copper Mines For 1954

Arizona's production of gold, silver, copper, lead and zinc in 1953 was valued at \$240,697,080 and exceeded by 2 percent the previous high of \$235,289,045 attained in 1951.

Arizona retained first place in copper production and in total value of the five metals. Its copper output was 46 percent greater than that of Utah, the second largest producer. The state ranked fourth in silver output, fifth in gold, eighth in lead, and tenth in zinc.

Copper mining, as in previous years, dominated the production picture. The quantity of copper ore treated increased from 44,472,522 tons in 1952 to about 45,550,000 tons in 1953, the largest tonnage on record. In contrast, the quantity of zinc-lead and zinc-copper ores mined decreased to about 470,000 tons compared to 797,597 tons in 1952.

pared to 797,597 tons in 1952.

The principal producers of copper in 1953 were the Morenci and New Cornelia open-pit mines of Phelps Dodge Corporation, Ray open-pit and underground mines of Kennecott Copper Corporation, open-pit and underground operations of Inspiration Consolidated Copper Company, the Copper Queen underground mine of Phelps Dodge, underground operations of Miami Copper Company and of Magma Copper Company, Castle Dome Copper Company's open pit, and Bagdad Copper Corporation's open pit. These nine properties produced 98 percent of the state's total copper.

The steady trend from large-scale underground mining to large-scale open-pit mining continued. Before World War II, open-pit operations supplied less than one-third of the total copper ore production in the state. Since then, the number of pit operations has increased from one to six and the percentage of ore mined by pit methods to 84 percent in 1953. In all operations, increased emphasis is being placed on mechanization and technological improvements in mining methods to offset higher labor costs.

ods to offset higher labor costs.

The Iron King Branch, Shattuck Denn Mining Corporation, at Humboldt was the state's largest producer of both lead and zinc. The Copper Queen Branch of Phelps Dodge suspended the production of lead-zinc in June, the United Verde Branch closed its copper-zinc operations in March, and a further decline in activity at small lead-zinc properties was reported. Important producing mines, shut down in 1952 after the sharp decline in lead and zinc prices, remained closed.

The larger producers of lead, in addition to Iron King, were American Smelting and Refining Company's Trench Unit at Patagonia, Athletic Mining Company near Klondyke, Hilltop mine of American Zinc, Lead and Smelting Company in the San Simon district, and the Copper Queen Mine at Bisbee.

per Queen Mine at Bisbee.

American Smelting's Trench Unit (including custom ore) ranked second in zinc production, and the Republic-Mammoth mine of Coronado Copper and Zinc Company near Dragoon was third. Other substantial zinc producers were Manhattan Consolidated Mines Development Company's Old Dick mine, the Athletic, B. S. & K. Mining Company's Atlas group in the Silver Bell district, and the Copper Queen Branch of Phelps Dodge.

About 80 percent of the state's total gold production was recovered from copper ores; and zinc-lead and zinc-copper ores yielded most of the remaining 20 percent. Sizable shipments of gold-silver ore were made by the Swisshelm mine in Cochise County and the Allison in Pima County. Placer production was neglitible.

The state's silver production also came largely as a by-product with copper ores yielding 78 percent of the total and lead-zine and zine-copper ores 18 percent. The Ash Peak Lease in Greenlee County, producing a high-silica silver fluxing ore, was the project execution.

was the major exception.

The loss of two major copper producers through exhaustion of ore reserves—
United Verde and Castle Dome—is being more than offset by new explorations and developments. These projects, when in full production, will add more than 150,-000 tons annually to the state's copper output.

output.

First to come into production in 1954 will be the Silver Bell open-pit mine of American Smelting and Refining Company, northwest of Tucson. Plans call for a daily production of 7,500 tons of ore and 7,500 tons of waste when full production is attained. Present known ore reserves give the mine a life expectancy of 12 years, with an annual output of 18,000 tons of copper. A modern town has been constructed to serve the needs of the 250 men who will be employed regularly.

Also scheduled to reach production in 1954 is Copper Cities Mining Company's open-pit mine near Miami. Production from Copper Cities will replace for the parent company, Miami Copper Company, the production lost through cessation of production in December 1953 by another subsidiary, Castle Dome Copper Company. The entire Castle Dome plant including the 12,000 ton per day floation mill, is being dismantled and moved to the Copper Cities operation. Estimated annual production is 22,500 tons of copper from ore containing less than 1.0 percent copper. Excavations in preparation for plant construction, plus waste stripping from the ore body, required the removal of 5,000,000 tons of material in 1953.

Miami Copper Company, Miami, is spending an estimated \$3,000,000 to develop for mining a new low-grade area in its own property. This deposit is said to average only 10 pounds of recoverable copper per ton of ore. Production probably will start during the third quarter of 1054.

1954.

Phelps Dodge Corporation expects to start ore production from its Lavender Pit at Bisbee during July 1954. Within a few months of that time the concentrator will be up to its full capacity of 12,000 tons of ore per day. The ore body is expected to produce at a rate of 38,000

tons of copper annually over a period of 11 to 12 years. The operation will require the removal of 70,000,000 tons of waste, 40,000,000 of which must be removed before production starts. In 1953, stripping required the daily removal of approximately 57,000 tons of material, all handled by truck haulage.

Overshodowing all other developments

handled by truck haulage.

Overshadowing all other developments in Arizona is San Manuel Copper Corporation's underground project. The company, a subsidiary of Magma Copper Company, is investing \$120,000,000 to bring into production in 1956 or 1957 the San Manuel ore body estimated to contain over 500,000,000 tons of 0.8 percent copper ore. Mining, concentrating and smelting facilities geared to handle 30,000 tons of ore daily, with an annual output of 70,000 tons of copper and 3,000 tons of molybdenum, are being provided. Bagdad Copper Corporation outlined its plans for expanding the capacity of its sent installing electrolytic refinement.

Bagdad Copper Corporation outlined its plans for expanding the capacity of its open-pit and installing electrolytic refining facilities at the mine. This expansion is designed to increase Bagdad's annual productive capacity to 17,500 tons of electrolytically refined copper and 6,000 tons of recoverable copper contained in precipitates, compared to its present capacity of 10,000 tons of recoverable copper in concentrates.

In October, the Christmas mine was returned to production by a new corporation, Riviera Mines Company. This company is working under a GSA contract covering 3,000,000 pounds of refined copper to be produced by December 31,

An important producer which entered the production picture in 1953 is the Pima Mining Company, near Sahuarita. By geophysical methods, this company discovered an ore body, the apex of which lies 225 feet beneath the desert surface, and confirmed the indications by test drilling. A 625-foot shaft was sunk and drifting conducted on four levels. Ore mined during exploration and containing 5 to 6 percent copper was shipped to ASARCO's El Paso, Texas Smelter. Pima's success is an outstanding example of the value of geophysical methods of prospecting.

prospecting.

Exploration work by the Banner Mining Company at its Plumed Knight and Mineral Hill properties, near Tucson, also was successful. At the year-end a 400-ton per day copper-tungsten flotation plant was under construction. The mill is scheduled for completion in March 1954.

Government contracts, which provide a guaranteed price for a definite tonnage of metal, were negotiated with all of the companies mentioned, except Pima Mining Company, for these new projects. The guaranteed price ranges from 22 cents a pound for copper from the Lavender Pit to 32 cents for Christmas production.

Arizona Production of Gold, Silver, Copper, Lead, Zinc and Dollar Value from 1941 Through 1953

Gold	Silver	Copper	Lond	Zinc	Dollar	
Ounces	Ounces	Tons	Tons	Tons	Value	
253,651 171,810 112,162	7,498,260 7,064,467 1,713,889 4,394,039	326,317 393,387 403,181 358,303 287,203	15,638 14,773 13,727 16,707	16,493 18,522 19,677 29,077 40,226	97,638,310 114,525,600 121,212,902 113,094,806 95,963,006	
79,024	3,268,765	289,223	23,930	43,665	114,986,254	
95,860	4,569,084	366,218	28,566	54,644	182,752,53	
109,487	4,837,740	375,121	29,899	54,478	196,207,948	
. 118,313	4,970,736	359,021	33,568	70,638	177,894,134	
	3,325,441	403,301	26,383	60,480	201,033,694	
	5,120,985	415,870	17,394	52,999	235,289,04	
	4,701,330	395,719	16,520	47,143	220,686,27	
	4,352,000	392,300	9,300	27,300	240,697,08	
	Ounces 315,392 253,651 171,810 112,162 77,223 79,024 95,860 109,487 108,993 118,313 116,093	Ounces Ounces 315,392 7,498,260 253,651 7,064,467 171,810 5,713,889 112,162 4,940,039 77,223 3,558,216 79,024 3,268,765 95,860 4,569,084 109,487 4,877,40 108,993 4,970,736 118,313 3,325,441 116,093 5,120,985	Ounces Ounces Tons 515.392 7.498.260 226.317 255.651 7.064.467 393.387 171.810 5.713.889 403.181 112.162 4,394.039 388.303 77.223 3,558.216 287.203 79.024 3,268.765 289.223 95.860 4,569.084 366.218 109.487 48.87.740 375.121 108.993 4,970.736 359.021 118.313 3,325.441 403.301 116.093 5,120.985 415.870	Ounces Ounces Tons Tons 315,392 7,498,260 326,317 15,638 253,651 7,064,467 393,387 14,772 171,810 5,713,889 403,181 13,727 77,223 3,558,216 287,203 22,867 79,024 3,268,765 289,223 23,930 95,860 4,569,088 366,218 28,566 109,487 4,837,740 375,121 29,899 108,993 4,970,756 359,022 33,568 118,313 3,325,441 403,301 26,383 118,003 5,120,988 415,870 17,394	Ounces Ounces Tons Tons Tons 315,392 7,498,260 326,317 15,638 16,493 253,651 7,064,467 393,387 14,772 18,522 171,810 7,13,899 403,181 13,727 19,677 77,233 3,558,216 287,203 22,867 40,226 95,860 4,569,084 366,218 28,566 34,645 109,487 4,837,740 375,121 29,899 54,478 108,993 4,970,736 359,021 33,568 70,658 118,313 3,325,441 403,301 26,383 60,480 116,093 5,120,983 415,870 17,394 25,999 112,358 4,701,330 395,719 16,520 47,143	

1. Estimated

Financial aid in the search for new reserves of strategic and critical minerals was continued during 1953 by the Defense Minerals Exploration Administration. At the year's end there were 13 active projects in Arizona, involving a total of \$802,122 in combined government and private capital. These contracts were awarded Arizona operators in their search for copper, lead, zinc, asbestos, fluorspar, manganese, mercury and tungsten. One of the outstanding developments

One of the outstanding developments of 1953 was the growth of manganese production particularly in the western part of the state. General Services Administration opened its Wenden Purchasing Depot on January 26, 1953, and by the end of the year had purchased 2,089,283 units of manganese out of the 6,000,000 units alloted the depot. Arizona producers had received over \$2,000,000 for manganese ores delivered. \$2,000,000 for manganese ores delivered Shipments by truck and carload are averaging 3,000 tons weekly of 19.4 percent manganese ore for which GSA is paying an average of \$25.00 per long ton, after sampling, milling and handling charges. Now that the government's manganese purchase program has been ex-tended to June 30, 1958, every effort is being made to secure an increase in the legal limit of purchases at Wenden and thus establish a permanent manganese industry within the state.

Uranium mining continued to expand with the majority of production coming from mines in the Lukachukai Mountains from mines in the Lukachukai Mountains of northeastern Arizona. This ore was trucked to Shiprock, New Mexico for future milling by Kerr-McGee Oil Industries, Inc. First shipments of uranium ore were made from the Holbrook area. The ore was shipped by rail to Bluewater, New Mexico for eventual processing at Anaconda Copper Mining Company's new mill.

CALIFORNIA

new mill

Tungsten, Manganese, Chrome **Miners Operate at Capacity**

For the second consecutive year, the production of gold, silver, copper, lead, and zinc declined. The total value of these five metals was \$12,926,582. This is a 24 percent drop from the \$17,151,-

18 a 24 percent drop from the \$17,151,792 value in 1952.

The "big four" among California gold producers furnished 77 percent of its gold. These companies are: The Natomas Company, dredges, American River district, Sacramento County; Yuba Con-solidated Gold Fields, dredges, Yuba River district, Yuba County; the Empire Star Mines, Ltd., and Idaho Maryland Mines Corporation, both working gold ore in the Grass Valley-Nevada City dis-

ore in the Grass Valley-Nevada City dis-trict in Nevada County.

Copper production decreased 59 per-cent despite the favorable price struc-ture. The Penn mine, largest producer of California copper in 1952, operated only the first 20 days of 1953. Copper in concentrates was recovered from the concentrates was recovered from the zinc ore milled. The state's copper was produced by numerous small mines and as a byproduct from the production of

other metals.

Anaconda Copper Mining Company,
Darwin group, Coso district, Inyo County,
was the only California mine that produced appreciable quantities of lead and zinc in 1953. Anaconda also produced a large percentage of the state's silver as a byproduct of lead and zinc.

California Production of Gold, Silver, Copper, Lead, Zinc and Dollar Value from 1941 Through 1953

Year		Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Value Value
1941		.408,793	2.154.188	3.943	3.464	440	52.231.066
1942	***********************	847,997	1.450.440	1.058	5.151	613	31,771,607
1943		148,328	609.075	8,762	5,820	1.856	9.176.616
1944	************************	117,373	778,936	12.721	5,682	8.455	10.933.495
1945	**********	147.938	986.798	6.473	7.224	0.023	11.152.081
1946	***************************************	356,824	1.342.651	4,240	9,923	6.877	18,788,664
1947	*************************	431,415	1.597.442	2,407	10.080	5.415	21,769,620
1948	************************	421,473	724.771	481	9.110	5,325	20.294.093
1949	**************************	417,231	783.880	649	10.318	7,209	20,616,562
1950		412,118	1.071.917	696	15.831	7.551	22.081.859
1951		339,732	1.145.219	921	13,967	9,602	21,700,575
1952	***************************************	258,176	1.099.658	800	11.199	0.419	17 151 793
19531		237,340	1.047.480	330	8.750	5,300	12,926,583

1. Estimated



DIFFERENTIAL

Air Dump Cars Serve the World's Richest Copper Mine

At this impressive ore deposit in Chuquicamata, Chile, Differential Air Dump Cars are used exclusively.

From an initial order for 20 cars (shipped in 1929) the Chuquicamata fleet of Differentials has grown to 120 cars. (And 60 additional cars are on order.) All dump cars purchased for this mine since the initial order in 1929 have been Differentials.

Today's Differential Air Dump Car shows some refinements but sticks to the original double-trunnion, double-fulcrum design which has earned a reputation for speedy, trouble-free and satisfac-tory performance through the years.







Action photographs taken at Chuquicamata

OTHER DIFFERENTIAL PRODUCTS:

Locomotives, Mine Cars, Mine Supply Cars, Rock Larries, Mantrip Cars, Rotary Dumpers Other Dumping Devices and Complete Haulage Systems



SINCE 1915-PIONEERS IN HAULAGE EQUIPMENT

The American Smelting and Refining The American Smelting and Refining Company's Selby smelter operated its lead plant and gold-silver refinery throughout 1953 at a high rate of production on material largely from Latin America and the Antipodes. A 350-ton-per-day slag fuming plant was put into operation April 21, 1953 and zinc fume was recovered from current hot slag and from cold slag in dumps.

The Bishop area, near Bishop, continue to be the state's leading tungsten producer. United States Vanadium Company operated its mine and mill during

pany operated its mine and mill during 1953, and purchased ore and flotation concentrates from many other producers

in the West.

The Tungstar mine and the Hanging Valley Mines, both near Bishop, formed a consolidation. The properties are now leased and operated by Clarence Hall. The Round Valley Tungsten Company operated its Round Valley mine and 40-

ton mill south of Bishop.

The Strawberry tungsten mine, located within six miles of Yosemite National Park, had a very successful season. The mill was operated for 166 days during the summer months and treated approximately 85 tons of tungsten ore per day.

Manganese ore from numerous deposits throughout the state was shipped intermittently to the U.S. government stockpile at Wendon, Arizona. Two manganese mines in San Bernardino County-resumed production in April 1953. They are the New Deal mine and the Monu-ment King mine. The Ladd mine in San Joaquin County, produced 100-tons-per-day of ore averaging about 28 percent MnO.

The Leviathan mine, near Marklees-ville, owned by Anaconda Copper Min-ing Company, furnished sulphur for Ana-conda's sulfuric acid plant at Yerington, Nevada. The mining and loading are done by Anaconda, and the ore is deliv-ered to a transportation contractor who hauls the ore to Yerington, 55 miles

away.

The Eagle Mountain mine of Kaiser
Steel Corporation produced 1,759,437
tons of iron ore during the year. This
was a five percent production gain over
the 1952 figure. The ore is shipped to
the open hearth furnaces at Fontana.

The Castro Chrome Associates mine,
near San Luis Obispo, is now producing
100 tons of chrome ore per day. Production from this mine is an important

duction from this mine is an important addition to the government's stockpile. The Castro mine is the largest chrome producer in California and the second largest in the United States. Small pro-ducers in Siskiyou and Del Norte counties shipped chrome ore and concentrates to the government stockpile at Grants Pass, Oregon during the year.

CENTRAL STATES

Low Lead And Zinc Prices Force **Many Mines To Cease Operations**

Mine production of recoverable lead in the West Central States decreased 9 perthe West Central States decreased 9 per-cent in quantity and 25 percent in value in 1953 when 136,650 tons of recoverable lead, valued at \$36,348,900, were pro-duced. Southeastern Missouri accounted for 90 percent of this amount with the Tri-State district accounting for the re-

maining 10 percent.

Zinc mining in the Tri-State district dropped 43 percent in 1953 when compared to 1952, as 3,481,400 tons of crude ore yielding 99,930 tons of zinc concentrates were produced. Oklahoma accounted for 62 percent of the district total, Kansas 25 percent, and southwest Missouri 13 percent. Southeast Misouri produced 3,250 tons of recoverable zinc, most of which was obtained from the re-treatment of old tailings and was not in-cluded in the Tri-State total.

In the southeastern lead region of Mis-In the southeastern lead region of Missouri, there was a 7 percent drop in crude ore production in 1953, as compared to 1952, but the quantity of recoverable lead remained the same. This region was the largest producer of lead in the nation for the 46th consecutive year. All major companies continued exploration and development projects throughout the percentage.

velopment projects throughout the year. In the southeastern zinc region of Missouri, declining lead and zinc prices had a drastic effect. As 1953 ended, only one pit and one mine remained active, com-pared to three pits and four mines at the beginning of the year.

Missouri Production of Lead, and Zine from 1941 Through 1953

Year																Lead Tons	Zinc Tons
1941				ī												165,909	21,932
1942	4.															199,548	36,394
1943																184,910	30,413
1944																174,683	36,626
1945																176,575	22,175
1946	* *															139,112	22,234
1947																132,246	17,074
1948																102,288	6,463
1949	**															127,522	5.911
1950																134,626	8.189
1951																123,702	11,476
1952																	13,986
19531		,	ĺ	ĺ	Ġ	ĺ	í	ú	 í		ı	i	ú		ú	 124,100	10,250

1. Estimated

Mine production of lead and zinc in Oklahoma dropped 43 percent in 1953 as compared to 1952, resulting in a 37 percent drop in recoverable lead and a 39 percent drop in recoverable zinc. The full impact of this reduced output occurred in the last half of the year. A strike at the Eagle-Picher Company's Central mill, from June 21 to December 22, caused this drastic drop. Approximately 100 mines were operating in early 1953. This number was reduced to about 20 by the end of 1953. Ten mine mills operated in January and seven continued produc-ing in December. All tailings mills shut down at the end of 1952.

Kansas Production of Lead, and Zine from 1941 Through 1953

Year		Lead Tons	Zinc Tons
1941		. 14,538	71,403
1942		9,419	55,874
1943		. 9,213	56,944
1944		0.204	63,703
1945		. 7,370	48,394
1946		6 AAE	47,703
1947		9 300	41,491
1948		0.704	35,57
1949		0.000	29,43.
1950	***************************************	. 9,487	27.170
1951		. 8,947	28,90
1952		. 3,916	25,48
19531		. 2,950	13,600

1. Estimated

Kansas mine production received a severe setback in 1953. National Lead Company suspended its Ballard operations indefinitely in mid-November due to low metal prices and the low grade of ore. There were four mills and about 40 mines operating at the beginning of the year, while one mill and about eight mines were active in December. The strike at the Eagle-Picher Central mill in Oklahoma accounted for a large part of this reduction since Kansas shippers to this mill were unable to have their ore processed. No tailings mills were active in

Zinc and lead production in the Illi-nois-Kentucky district declined 30 and

Oklahoma Production of Lead, and Zine from 1941 Through 1953

Year	Lead Tons	Zinc Tons
1941	25,021	166,602
1942	22,806	146,510
1943	19,733	114,089
1944		91,449
1945	12,664	69,300
1946		69,552
1947		51,062
1948	16,918	43,821
1949	19,858	44.033
1950	20,724	46,739
1951	16,575	53,450
1952	15,137	54,916
19531	9,600	33,450

1. Estimated



LARGEST CHROME MILL in California, and second largest in the United States, is that of Castro Chrome Associates near San Luis Obispo. The 100-tons-per-day gravity concentrator produces 44 percent Cr2O3 concen-

36 percent, respectively. This was due to the low zinc and lead prices which re-sulted in the closure of the Hutson mine in Kentucky and also to labor strikes a the Ozark-Mahoning Company and Min-erva Oil Company mines which produce zinc and lead as a coproduct with fluorspar.

spar.

Late in the year the Eagle-Picher Company completed its new germanium processing plant at Miami, Oklahoma. Production from this plant will help meet the shortage of this new metal, The Eagle-Picher Company has been the principal producer of this metal for many years. It is recovered as a byproduct in the zinc refining process.

the zinc refining process.

Late in 1953 the incline project at the
No. 2 National Shaft of the St. Joseph No. 2 National shart of the St. Joseph Lead Company was completed and put into operation. It will handle supplies for 20 mine groups and two general mines. Most supplies and heavy machinery can now be lowered into the mines on incline now be lowered into the mines on incline cars. Previously heavy machinery was dismantled and then rebuilt after being lowered into the mines.

Near the end of the year St. Joe Lead put its new Indian Creek mine and mill

into operation. The mill will treat 2,500 tons of ore per day, assaying about 4 percent lead.

COLORADO

Uranium Boom and Problems; **Climax Expansion Completed**

The mining industry in Colorado continued to be dominated by uranium production in 1953. The Uravan Mineral Belt, which extends from Gateway in Mesa County South through Uravan in Montrose County and southwest to Slick-Montrose County and southwest to Slick-rock in San Miguel County, continued to be one of the major sources of domestic uranium. Ores from this area, which in-cludes the Calamity, Outlaw, Gateway, Dolores, Club Mesa, Long Park, Mono-gram, Bull Canyon, Gypsum Valley and Slickrock districts, are capable of and probably do supply the mill requirements for the six major processing plants treat-ing the carnotite-type ores of the Plateau. The six mills are located at Monticello. The six mills are located at Monticello, Utah; Durango, Naturita, Uravan, Grand Junction and Rifle, Colorado. The Durango, Naturita and Uravan plants have increased their plant capacities substantially within the past 12 or 18 months.

In 1953, uranium mining and the United States Atomic Energy Commission's raw materials procurement pro-gram were greatly influenced by three major developments. The first, although of a somewhat negative influence, is of particular importance in that mine production greatly exceeded milling facili-ties. This points out the problems of an industry dominated and controlled by a government agency that regulates ore buying schedules and the distribution of ore to the mills. Recent announcements by the AEC indicate its realization that two and possibly three new mills are now justified, but the 18 to 24 months needed for contract negotiation and mill construction will undoubtedly have some influence on mine production detrimental to the overall atomic energy program. Many Colorado mine and mill operators believe that a competitive milling industry, by private enterprise, in conjunction with an adequate price for ore and proc-essed concentrate, can stimulate all



What other drill steel backs its quality with a written guarantee? That's what COPCO gives you! Its justly famous Coromant Steels are 100% warranted against defects . . . even guaranteed against normal operating hazards within reasonable limits! There are numerous other features of COPCO drills that make them the stand-out buy - one piece carbide bit-and-rod construction, chisel shape for better chip clearance, easy jobsite resharpening, and so on. See all its advantages for yourself-read the written guarantee . . . watch it in action in your own mine.

Simply drop a card or note to the nearest COPCO office, asking for a demonstration of Coromant Drill Steels next time a field man is in your territory. He will do the rest.



PACIFIC Ltd. 930 Brittan Avenue-San Carlos, Calif. EASTERN Ltd. 250 Park Avenue-New York 17, N. Y. MEXICANA S.A.

Ave Juarez y Calle Comonfort Torreon, Coahuila, Mexico

BRANCH OFFICES AND WAREHOUSES THROUGHOUT NORTH AMERICA



THE CLIMAX MOLYBDENUM mine at Climax, Colorado was the largest underground metal mine in the United States in 1953. Tonnage mined and milled was 6,604,857 from which 37,306,341 pounds of molybdenum was recovered.

phases of domestic uranium production to

almost any degree desired.

The second development of great importance during 1953 was the passage of Public Law 250 which relieved the tension and the uncertainty of the validity of thousands of claims on the Colorado Plateau that had been located on preexisting oil and gas leases. Inasmuch as Public Law 250 only validated claims in conflict with oil and gas leases that were located subsequent to July 31, 1939, and prior to January 1, 1953, there still remained the basic problem of multiple use of the land and the validity of claims located after January 1, 1953. In January of 1954 the AEC issued Domestic Uranium Program Circular No. 7 which gives the procedures and provisions for leasing from the AEC lands covered by oil and gas permits and leases. In general, uranium prospectors, miners, and operators have reacted unfavorably to Circular No. 7.

The third development of increases.

No. 7.

The third development of importance in 1953 was the announcement by the AEC in September of the extension until 1962 of the guaranteed base price and 1962 of the guaranteed base price and onus payments for U3O8. In effect, the extension tends to stabilize the industry, and it has encouraged venture capital to enter the uranium field. Large oil and mining companies are becoming increas-

ingly active throughout the area. At this time there is much speculation in and promotion of mining claims and potential mining property, and there is little question that the Colorado uranium district is in the middle of a boom period. The year 1954 should experience little letdown unless the lack of milling facilities should become so acute as to necessitate a curtailly server of prining corrections.

less the lack of milling facilities should become so acute as to necessitate a curtailment of mining operations.

Metal mining in Colorado in 1953 ebbed to a low point with only about 150 operators contributing to the output of gold, silver, copper, lead, and zinc. Production decreased heavily in both quantity and value, according to the Denver Office of the U. S. Bureau of Mines. The total value of the five metals decreased from approximately \$36,000-000 in 1952 to \$21,893,000 in 1953 as a result of the continued downward trend in prices of lead and zinc. A number of companies closed their mills during the year, including the Shenandoah-Dives Mining Company at Silverton and the Resurrection Mining Company at Lead-ville.

ville.

Although Colorado ranked fourth among the states in production of gold, lead, and zinc, fifth in silver, and ninth or tenth in copper, production decreases amounted to 5 percent for gold, 25 percent for silver, 22 percent for copper,

27 percent for lead, and 29 percent for

zinc.

The principal producing districts in 1953, in order of output based on the total value of the five metals, were Upper San Miguel, San Miguel County, Red Cliff, Eagle County, Leadville, Lake County, Cripple Creek, Teller County, Rico, Dolores County; and Sneffels, Creede, Mineral County.

The expansion program of Climax Molvbdenum Company neared comple-

The expansion program of Climax Molybdenum Company neared completion, to bring the total plant capacity to 25,000 to 28,000 tons per day, depending on the percentage of recovery desired. This program included the building of the Nos. 3 and 4 mills, each of which has a nominal capacity of 5,000 tons per 24 hours. The new Storke Level, 300-feet below the Philippson, was placed on a production basis. The Storke Level primary crushing plant and 4,000-footlong belt conveyor leading to the main secondary crushing plant operated from mid-January to year's end.

EASTERN STATES

Phosphate, Titanium, And Mica Production On The Increase

Phosphate production in Florida continues to expand with virtually every company building new plants or improving old facilities. Production from this state continued to be the most important in the world with 10,100,000 tons of high-grade ore and concentrates produced during 1953. New plants now in production or under construction include: International Minerals & Chemical Corporation's \$12,400,000 Bonnie chemical plant near Bartow; Davison Chemical Corporation's \$12,410,000 triple superphosphate plant at Ridgewood; and Armour Fertilizer Works \$7,000,000 washing and flotation plant near Bartow. New byproduct uranium plants are operated at Mulberry by International Minerals & Chemical Corporation, and Virginia-Carolina Chemical Corporation. The largest dragline in Florida and one of the largest in the world has been put into operacial at its Noralyn mine. The new machine will have a bucket capacity of 26 cubic yards. American Cyanamid Company has purchased a \$750,000 dragline and is working on an extensive reclamation project. Davison Chemical has also purchased a new \$750,000 dragline as part of its plan for increasing production.

tion project. Davison Chemical has also purchased a new \$750,000 dragline as part of its plan for increasing production.

Cramet, Inc., the subsidiary of Crane Company of Chicago, has chosen Chattanooga, Tennesee as the site for its new titanium plant. The DMPA will advance up to \$24,950,000 for constructing and equipping the plant which will have a capacity of 6,000 tons of ingots a year. When completed it will be the largest titanium operation undertaken so far in the combined government and industry expansion program for this metal. Partial production is expected in late 1954, with

the combined government and industry expansion program for this metal. Partial production is expected in late 1954, with full production being reached in 1955. Du Pont announced plans in September 1953 for construction of a \$3,000,000 mine and plant for production of ilmenite at Lawtey, Florida. It will be built and operated by Humphreys Gold Corporation, Late in the year, the American Cyanamid Company's Calco Chemical Division began construction of a \$14,000,000 titanium dioxide plant near Savannah, Georgia. Production is expected early in 1955.

Colorado Production of Gold, Silver, Copper, Lead, Zinc and Dollar Value from 1941 Through 1953

Year	Gold	Silver	Copper	Lead	Zinc	Dollar
	Ounces	Ounces	Tons	Tons	Tons	Value
1941 1942 1943 1944 1945 1946 1947 1947 1949 1950 1950 1951 1952	137,558 111,455 100,935 142,643 168,279 154,802 102,618 130,390 116,503 124,594	7,301,697 3,096,211 2,664,142 2,248,830 2,226,780 2,240,151 2,557,653 3,011,011 2,894,886 3,492,278 2,787,882 2,813,643 2,114,291	6,748 1,102 1,028 1,048 1,485 1,754 2,150 2,208 2,403 3,141 3,212 3,606 2,830	12,574 15,181 18,032 17,698 17,044 17,036 18,696 25,143 26,833 27,007 30,336 30,066 21,830	15,722 32,215 44,094 39,995 35,773 36,145 45,164 47,703 45,776 55,714 83,203 37,700	23,877,597 19,896,623 19,205,447 16,676,521 19,903,506 23,868,179 30,155,33 27,474,322 29,323,264 38,931,539 35,997,23 21,693,000

1. Estimated

Mica production was increased in the eastern states when the government began accepting green mica at the Govern-ment's Mica Purchasing Depot at Spruce Pine, North Carolina. Previously only ruby mica had been purchased by the

GSA.

Zinc production from mines in New York in 1953 reached the highest level in the history of the State and was 11 percent greater than the previous record percent greater than the previous record year, 1943. Lead output advanced 28 percent over the 1952 figure, whereas silver production remained virtually unchanged. The St. Joseph Lead Company operated its Balmat and Edwards mines continuously throughout the year. Silver, lead, and zinc are produced from the Balmat mine and zinc from the Edwards property. property.

Zinc production continued to decline in New Jersey in 1953. Compared with 1952 the output dropped 23 percent. Mines producing were New Jersey Zinc's Franklin and Sterling Hill, both of which operated throughout the year.

operated throughout the year.

In Pennsylvania as in previous years, gold, silver, and copper were produced along with iron from the Cornwall mine in Lebanon County by the Bethlehem Steel Company. No lead or zinc mining was reported in the state in 1953, but The New Jersey Zinc Company continued development of its zinc property near Friedensville. Friedensville.

Zinc production from mines in Virginia in 1953 rose 32 percent over that of 1952 and reached the highest level of any year since 1944. Despite the rise in zinc output, lead production dropped 21

percent.

The Austinville mine and 2,400-ton mill of The New Jersey Zinc Company operated throughout the year. Also at Austinville, The New Jersey Zinc Company has completed the first stage of details of the control of the con elopment at its Ivanhoe mine. of the three-compartment vertical shaft started in January 1952, and was bot-tomed on April 1953 at a depth of 1,050 tomed on April 1953 at a depth of 1,050 feet. Construction began on a permanent steel headframe and other hoisting equipment later in the year. Zinc ore will be transported underground to the Austinville mine through a 13,300-foot tunnel. According to the present schedule, the Ivanhoe should be in production sometime in 1955.

Late in the year New Jersey Zinc are

Late in the year New Jersey Zinc announced that it had purchased the Arminius mine near Mineral, Virginia. Drilling results at the zinc-lead property led to the decision to purchase the mine, which the company has had under option since 1951. Pumping and mining equipment will be installed to facilitate continued exploration. The mine has been inactive for the last 30 years.

In Tennessee, zinc production increased percent. Toward the end of the year l percent. Toward the end of the year New Jersey Zinc began sinking a new shaft near Jefferson City. Sinking of the 1.300-foot shaft is being done by the Utah Construction Company; it is expected to take about 14 months. Plans also call for the construction of a 1,000Idaho Production of Gold, Silver, Copper, Lead, Zinc and Dollar Value from 1941 Through 1953

Year		Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941	**********	149.816	16,672,410	3,621	104,914	79.084	41,776,848
1942	******************	95,020	14,644,890	3,430	113,909	87,256	46,063,326
1943	**********	30,808	11,700,180	2.324	96,457	86,707	43,199,910
1944	*********************	25,008	9,931,614	1,688	83,530	91,372	42,591,137
1945	***********	17,780	8,142,667	1,548	68,447	83,463	37,799,975
1946	**********************	42,975	6,491,104	1,038	59.987	71,507	37,610,123
1947	**********	64,982	10.345,779	1,640	78,944	83,069	55,164,670
1948	***********************	58,454	11,448,875	1,624	88,544	86,267	67,758,290
1949	*********	77,829	10,049,257	1,438	79,299	76,555	56,429,790
1950	********	79,652	16,095,019	2,107	100,025	87,890	70,198,64
1951	*******	45,064	14,753,023	2,160	76,713	78,121	70,953,653
1952		32,997	14,923,165	3,213	73,719	74,317	64,626,96
19531	*********************	19,120	14,249,700	2,790	70,565	63,028	47,670,84

1. Estimated

ton-per-day mill for concentrating the

Ore produced by the American Zinc Company of Tennessee during 1953 was from its Athletic, Grasselli, Jarnigan, Mas-cot No. 2, and North Friends Station mines in Tennessee. Development is continuing at the Young mine near New Market, Tennessee.

Market, Tennessee.

In Vermont, the Vermont Copper Company continued to operate its Elizabeth mine and 800-ton mill near South Strafford. Gold and copper production remained virtually unchanged; silver output declined nearly 5 percent. The entire copper output of the state for 1953 came from the Elizabeth price.

from the Elizabeth mine.

At Sunbright, Virginia, the Foote Min-eral Company constructed the world's largest lithium processing plant as part of largest lithium processing plant as part of a \$3,000,000 expansion program designed to meet the increased military and civil-ian demands for lithium chemicals. Other expansion included additional mining, milling, and processing equipment at King Mountain, North Carolina which will triple the mine's output of spodu-mene, the basic lithium ore. At Henderson, North Carolina, Tung-sten Mining Corp. continued to be the No. 1 tungsten producer in the nation by

No. 1 tungsten producer in the nation by producing more than 10,000 units per month of 65 percent WO₃.

month of 65 percent WO₅.

Near the end of 1953 Kaiser Aluminum and Chemical Corp. announced completion of the first phase of its huge primary aluminum works at Chalmette, Louisiana. The plant will supply 12 percent more aluminum than it was producing at the beginning of 1952 beginning of 1953.

IDAHO

Phosphate Mining Expands; **Development in Coeur d'Alenes**

The year of 1953 was disappointing to Idaho's metal mining industry, being marked by generally lower production, shutdowns and curtailments at base metal properties, a lessening of interest in new undertakings and a scarcity of new ore strikes. However, exploration,

development and improvement projects started in 1952 were for the most part continued and should prove successful

Low metal prices for zinc, lead and antimony, together with an 8%-cent-an-hour wage boost for miners, were responantimony, together with an 8%-cent-anhour wage boost for miners, were responsible for lower production of those metals and silver, generally a byproduct. Gold output was down mainly because of suspension of operations at Bradley Mining Company's open-pit Yellow Pine antimony-gold mine, 2,200-ton flotation plant and antimony smelter at Stibnite, Valley County, due to poor marketing conditions for antimony. Copper production was down because its major producer, Calera Mining Company's Blackbird mine, Lembi county, curtailed output of cobalt-copper ore. The curtailment resulted from refining problems at the new Garfield, Utah, cobalt refinery of Howe Sound Company, parent firm. The Coeur d'Alene mining region, Shoshone County, in Idaho's panhandle, continued to yield more than 90 percent of the state's lead and zinc, and the bulk of its silver. The Bunker Hill mine of the Bunker Hill and Sullivan Mining and Concentrating Company again ranked first in leadproduction, the Star mine of Sulivan Mining Company in zinc, and the Sunshine mine of Sunshine Mining Company in silver. Silver ore produced by the Sunshine and Polaris mining companies

pany in silver. Silver ore produced by the Sunshine and Polaris mining companies was the leading source of Idaho's copper

output.

Output.

One of the region's leading zinc-lead producers since 1889, the Morning mine at Mullan, was shut down permanently early in October. About 250 men were laid off by American Smelting & Refining Company, which earlier in the year had absorbed, through a merger, its subsidiary Federal Mining & Smelting Company, long-time operator of the Morning. Approximately 90 men were retained for salvage operations and to maintain the surface flotation plant, machine shop, electric shop and sawmill for use by other ASARCO mining operations in the district. Pumps were withdrawn from district. Pumps were withdrawn from lower levels and the entire mine was to be abandoned after mining of the shaft pillar in the vicinity of the main adit level. The Morning was the world's deepest zinc-lead mine, its ore body having been mined over a vertical dis-tance of 6,200 feet. Low metal prices and increased operating costs hastened the closing, which has been threatened for several years because of diminishing

Another major casualty of low base metal prices was Bunker Hill's block-caving of low-grade material.

Incentive leasing systems were substituted for comoany mining operations at a number of properties in order to weather the low-price period. These included Spokane-Idaho's Mining Com-

Production of Gold, Silver, Copper, Lead, and Zinc in New Jersey, New York, Pennsylvania, Vermont, and Virginia in 1952, and 1953*

	New.	lersey	New		Pennsy			nont	Virg	inia	Totals		
Metal	1952	1953	1952	1953	1952	1953	1952	1953	1952	1953	1952	1953	
Gold ¹ Silver ¹	1			39,021	14,8978	1,529 6,677 3,103		165 43,202 3,816			14.8970	1,694 88,900 6,919	
Copper ^g Lead ^g Zinc ^g	59,190	45,548	1,120 32,636	1,435 50,885	14,097-	3,103		3,810	3,792 13,409	2,989 17,338	4,912 105,235	4,42	

^{*} Estimateed 1 Fine ounces, 9 Short tons, 9 Includes Pennsylvania, Vermont, and Tennemee,

Short Tons of Ore Mined and Short Tons of Waste Stripped at Representative Open Pit Mines in the United States in 1952 and 1953

Mine	Company	Ove Mined	Wasta Stripped		Waste Stripped
Utah Copper	Kennecott Copper		W also blicklyte	Cive Agrined	m une smipped
Division Chino Mines	Corporation Kennecott Copper	32,036,100	46,910,576	29,922,200	49,291,904
Division	Corporation	8,279,895	17,262,746	7,751,017	12,877,436
Trail Ridge	Humphreys Gold				10,077,430
Jacksonville	Corporation Humphreys Gold	8,000,0004	0	7,800,0001	- 0
Ray Mines	Corporation	3,300,000	0	3,620,000	0
Division	Kennecott Copper Corporation	4,310,867	9,991,748	4 720 740	10 741 415
Castle Dome	Castle Dome	4,310,001	V,VVI,148	4,728,249	10,743,635
Nevada Mines	Copper Co., Inc.	4,300,937	235,229	3,952,775	644,704
Division	Kennecott Copper Corporation				
Liberty		3,852,234	1,979,621	3,780,298	2,135,212
Veteran Kimbley		Nil 124,143	Nil	Nil	3,249,462
Inspiration ⁰	Inspiration Cons.	124,143	5,236,177	985,782	1,442,031
Iron	Copper Co.	4,110,856	8,320,840	3,917,915	9,810,350
Mountain	Columbia Iron Mining Company	1,462,365	5,246,0000	2,057,469	9,943,000
Desert Mound	- Company	1,078,649	Included	1,261,578	Included
MacIntyre	National Lead		Above	-1	Above
Development	Company	1,278,550	1,956,738	1,347,293	2,021,460
New York Ore Division	Jones & Laughlin				
MAINING	Steel Corp.	989,6620	1,215,3964	1,278,2068	1,630,920
Eagle Mountain	Kaiser Steel Corp.	1,648,041	1,138,441°	1,759,437	1,215,217
Arizona Mines	Phelps Dodge	80 800 000			
Davison	Corporation The Davison Chemical	79,700,000	ore plus waste	90,900,000	ore plus waste
Cornwall	Corporation	746,000	5,700,000	847,000	6,700,000
COLUMBII	Bethlehem Cornwall Corporation	632,460	NII	200 100	9711
Bagdad	Bagdad Copper	032,409	NII	259,175	Nii
Gav	Corporation	-	3,960,399		4,891,426
Oay	J. R. Simplet Company	437,298	\$29,8810	750,0007	1
Brewster	American Cyanamid	427,1670	207,001	130,000	
Operations Saddle Creek	Company	697,020	4 222 2445	461 714	/ F20 020
Sydney		529,643	6,227,7585 6,693,5850	681,516 602,882	6,529,930 5,339,671
Quick Seven	American Zinc Lead		200001000		Stonelas
(Joint Venture) Van Stone	& Smelting Company American Smelting	90,293	-	657,353	
	and Refining Co.	29,053	821,493	336,223	765,062
Mt. Hope	Warren Foundry and				
Getchell ¹	Pipe Corporation Getchell Mine Inc.	115,000	345,000	128,295	800,000 \$13,180

Cubic yards overburden. Cubic yards. Approximate.

ong tons, netudes ore mined underground. Gross tons concentrate (magnetite plus martite). Gross tons rock.

Short Tons of Ore Mined at Representative Underground Mines in the United States in 1952 and 1953

Mine	Company	1952	1953
Climax	Climax Molybdenum Company	4,450,000	6,604,857
Butte Mines	Anaconda Copper Mining Company		
Copper ore		2,260,987	4,331,408
Zinc ore		1,869,879	1,331,063
Manganese ore		\$25,630	507,202
Miami	Miami Copper Company	3,749,162	3,705,113
Homestake	Homestake Mining Company	1,209,884	1,368,059
Cornwall No. 4	Bethlehem Cornwall Corporation	1,118,330	1,284,744
Cornwall No. 3	estimenta comman confermion	36,994	414,668
Old Bed	Republic Steel Corporation	948,701	1,086,849
Fisher Hill	(Port Henry, New York)	438,715	557,171
Harmony	(A die alemy, New York)	332,873	362,846
Ray Mines Division	Kennecott Copper Corporation	710,289	861,330
Nellie B. Division	American Zinc Lead & Smelting Company	859,923	
Magma	Magma Copper Company	300 547	782,888
Holden	Howe Sound Company	399,547	431,749
Mt. Hope	Howe Sound Company	545,776	433,717
Bunker Hill	Warren Foundry and Pipe Corporation	291,880	426,749
DROPEL LIM	Bunker Hill & Sullivan Mining &	440 400	
T	Concentrating Company	669,453	407,112
Treasury Tunnel	Idarado Mining Company Copper Raage Company	251,850	302,370
Champion	Copper Range Company		298,943
Elizabeth	Vermont Copper Company, Inc.	260,701	280,438
Trona	Intermountain Chemical Company	56,0001	270,000
Sunshine	Sunshine Mining Company	222,577	249,686
Hamme	Tungsten Mining Corporation	144,715	243,084
Star	Sullivan Mining Company	233,932	228,304
White Pine	White Pine Copper Company	Nil	225,000
Page	American Smelting and Refining Company	139,973	153,718
Darwin	Anaconda Copper Mining Company	132,995	137,733
Dales	Dale Mining Company	130,840	112,529
Morning	American Smelting and Refining Company	82,908	96,010
Frisco	remerisan constants and elements company	51,845	71,183
Triumph	Triumph Mining Company	73,605	93,105
Camp Bird	The King Lease Inc.	51,705	71,705
Mine No. 14	Minerva Oil Company, Fluorspar Div.	73,696	62,841
Crystal ⁴	armerva out Company, returnput prv.	14,780	66,904
Sidney	Sidney Mining Company	67,844	60,413
Silver Summit	Polaris Mining Company	51,852	47,123
Omega-Rothart			
Rico Mines	Polaris Mining Company	54,361	66,497
Aiax	Rico Argentine Mining Company	43.658	40,198
	Golden Cycle Corporation	20,967	23,803
Cremon Constitution	0-1-11-11-1	20,566	18,139
	Spokane Idaho Mining Company	49,000	22,000
Douglas	011 B 11 111 0	10,000	12,000
Silver Bell	Silver Bell Mines Company	26,040	13,913
Carbonero		5,756	14,196

Approximate. 2. Development only. 3. Four mines. 4. Crude hoisted.

pany's Constitution mine, Nabob Silver-Lead Company, Highland-Surprise Con-solidated Mining Company and Day Mines Inc's Tamarack mine, all in Shoshone County

The base metal situation led Sullivan Mining Company to postpone exploration and development of the extensive holdings of Silver Mountain Lead Mines east of Mullan, Shoshone county. It completed a new 8,500-foot adit to its Star mine shaft from Burke to lower production costs and virtually completed a multimillion dollar sulphuric acid plant

a multimillion dollar sulphuric acid plant and improvement program at its electrolytic zinc plant near Kellogg.

Bunker Hill & Sullivan Mining and Concentrating Company, which owns Sullivan Mining Company jointly with Hecla Mining Company, completed a \$3,000,000 modernization program at its Kellogg lead smelter and started a \$1,000,000 shaft-extension and deep exploration project at its Concentration in the

dou,000 shart-extension and deep exploration project at its Crescent mine in the silver belt of the Coeur d'Alenes.

Also in the silver belt, Polaris Mining Company began a \$700,000 two-mile, below-sea level exploration drift easterly from its Silver Summit mine through properties of Merger Mines Corporation, Silver Standard Mining Company, American Silver Mining Company and Rainbow Mining and Milling Company, controlled by Coeur d'Alene Mines Corportion

At the same time, Polaris Mining Company started deep exploration of the adjoining Chester Mining Company property from the 3,000-foot level of Silver Summit Mine, Sunshine Mining Company began opening a new 3,850-foot level in its own property and stepped up exploration and development stepped of neighboring properties under operat-ing agreements. It also revamped and modernized its flotation mill and reacti-

modernized its flotation mill and reactivated its antimony leaching plant.

The silver belt was the scene of the Coeur d'Alene region's only major ore strike of 1953. American Smelting and Refining Company made the discovery 3,000 feet below the surface at the old Galena mine (now Vulcan). High grade tetrahedrite was found in a strong siderite vein southeast of galena-bearing veins previously opened. Two short shoots of tetrahedrite ore were opened in the New Purim area of the silver belt by Polaris Mining Company from the 3,000-foot level of its Silver Summit mine. mine.

mine.

In the Mullan area, Silver Buckle Mining Company of Wallace and New Park Mining Company of Salt Lake City started preparations for a proposed \$229,500 shaft sinking and development project at the Vindicator Silver-Lead property. Hecla Mining Company contracted to explore and develop the 36-claim Princeton property for a 60 percent interest in ore found. Lucky Friday Mining Company opened a new 2,300-foot level in its lead-silver-zinc producer and undertook to explore adjoining properties of Hunter Creek Mining Company erties of Hunter Creek Mining Company and Lucky Friday Extension. West of Kellogg, Gibbonsville Mining

West of Kellogg, Gibbonsville Mining & Exploration Company started its new 400-ton flotation plant on Coeur d'Alene river valley tailings. At Burke, Day Mines, Inc., began deepening its Hercules mine shaft under a \$242,860 DMEA lead-zinc exploration contract. Near Clark Fork, Idaho, Whitedelf Mining and Development Company completed deepening its shaft from the 450 to the 800 level and opened lead-silver ore there.

silver ore there. In central Idaho, Bradley Mining Company put a new scheelite tungsten

IRON ORE SHIPMENTS IN GROSS TONS FROM MINNESOTA, MICHIGAN, AND WISCONSIN BY COMPANIES AND MINES FOR 1951, 1952, AND 1953

Company Mine	1951	1952	1953	Company	Mine	1981	1952	1953	Company Mine	1951	1932	1983
E. C. Bradley & Se 1951 (41,908), 195		0). 1953 (2	4.017)		-	ing Compar		100 175)	Sibley Soudan	239,687 195,545	157,004, 191,122	87,649 188,255
srantey	41,908	49,559	24,017	Minnewas		90,511	72,155	88,058	Gross Marble			1,334,431
Long tons.				Mississipp			1,074	2.057	Mariska Extension Pilotac (Taconite)		230,947 104,464
Charleson Iron Mis		406) 1051	(102 ((0)	Elbern Ernie Mi	ne	131,132	136,845	130,514 3,546	Pioneer Mining (Company		
1951 (239,578), 19 Charleson con-	952 (246,	496) 1953	(192,660)	Atkins				76,000	(Formerly Stanle		Co.)	
centrator 1	198,971	177,334	192,660	Inland St	cel Con	npany			1951 (46,820) 1			(502,016)
Glen stockpile	40,607	69,162		1951 (1,	708,608)	1952 (1,5	10,641)		Mary Ellen	464 920	264 490	502.014
Cleveland-Cliffe Ire		F10 2151		Morris (1,467,40	353,645	294,569	324,150	(Conc.)	464,820	364,489	502,016
951 (9,070,935), 1953 (8,321,927)	1427 (1	,510,215)		Greenwoo	d	69,695	100,956	91,330	Pacific Isle Mini			
Athens	610,590	465,922	447,576 126,191	Sherwood Bristol		499,619 192,286	433,603 199,763	413,144 259,662	1951 (372,929)		857) 1953	(551,677)
Bunker Hill Cambria-Jackson	376,108	45,621 345,513	126,191 349,622	Armour N	io. 1	216,149	148,192	136,071	The Drew, Crox	41,949	41,212	**128,213
Cliffs Shaft	729,991	531,457	517,715	Armour N		377,214	333,558	243,044	Dunwoody	556	48,120	64.81
Lloyd Maas	233,144 789,528	71,120 486,174	114,646 562,100			Company			Emmett Graham		69,855	**68,03 1,63
Mather 1,	555,766	1,446,938	2,248,146		9,335)	1952 (125,8		DIACON AND AND ADDRESS OF THE PARTY OF THE P	Uno-Kerr		91,083	58,10
Ohio Filden	88,586	80,449	124,615 103,393	Jessie		149,335	125,850	167,256	Lamberton Missabe	31,520	3,083	6,95
Vebster		59,507				in Steel Cor			Mountain	2,918	10,047	3,87
pies Agnew-Alworth	250,123	126,727	177,406	1951 (3,	2,884,84	1952 (2,7	771,233)		North Shiras Shiras	43,364 1,188	89,444 5,366	41,25 19,48
Atkins	331,625 247,206	350,252 53,383	221,054	Hill Ann	ex	699,843	638,067	583,590	Wacootah (A &]	8)	32,347	33,80
Canisteo	922,285	825,737	796,181	Wentwort	h		182,620	354,747	York Brunt Trespass	77,247	147,912	83,03 13,28
Hawkins Hill-Trumbill	572,041 807,335	709,711 668,210	528,374 765,863	Schley Columbia		248,132 683,614	230,124 424,893	394,129 592,414	Cyprus-Rust			24,78
Holman-Cliffs	807,335 958,393	668,210 766,025	765,863 921,590	Missabe	Mountai	n 21,884	24,305	592,414 71,470	Minorca W. Leas Nordine	e		2,58
Vanless	255,126 281,613	239,562 237,907	185,448 132,007	South Lo	ngvear	974,694	720,247 349,409	838,726	Pacific Fee			1,35
L. W. Coons Comp	pany			Sauntry		205,696	200,970	40.000	(* Hedman Min	ing Co. mi	ies)	
951 (413,200), 1		,385)		Graham			598	49,766	Pickands Mather	& Compa	ny	
1953 (502,642)	268 600	220 (24	150 015	Globe In			(6) 10E4 C	0.705	1951 (14,317,634	1) 1952 (1:		
lenoa Sparta u'ia	368,699	220,684 8,118	158,037 109,763		.(11)	1952 (44,59			1953 (14,390,0	028)		
sidney		105,134	124,951	Cornell		39,777	44,596	19,705	Erie (Taconite) Embarrass	1,480,733	93,867	211,24 1,366,75
ictoria incoln "D"			15,059 149,350	W. S. M.					Biwabik	248,490	185,678	237,46
evlile stockpile			377		59,771)	1952 (672,			Corsica Wade	382,367 436,665	284,215 293,314	461,26 370,86
outh Commodore			1,126	Margaret Missouri	Stockni	10,234 le 13,095	71,280 15,117	71,046 15,142	Albany	386,986	303,561	399.27
1. A. Hanna Com 951 (13,677,204)		11 669 6271		Hanna	- Contraction	101,406	50,291	60,850	Scranton	950,840	731,862 3,014,717	621,06
1953 (15,675,07	4)	11,000,021)		Judson Pilot-Ann	ev.	100,507	50,291 11,736	167,773 130,404	Mahoning Carmi	3,454,649	515,098	672,4
Frunt			13,286	Pilot	N/A		159,598	8,165	Bennett Danube	614,154	471,789 565,474	548,83 796,40
Bray Gordon	879,258	772,824 90,999	306,943 430,803	Prindle Yawkey		281,668 35,323	189,269 21,179	132,263 14,386	Rabbit Lake	758,204	147,848	465,31
Mesabi Chief	547,017	495,129	326,516	Knox			22,217	50,947	Mahnomen	515,149	413,412	318,4
Stein Buckeye	6,448 294,659	30,668 452,104	254,195 656,561	Margaret Prindle S				7,569 18,530	Sagamore Cary	434,991 611,832	346,810 536,776	401,41 529,12
Jennison .	522,804	335,153	8,411	Stubler	tor white	a .		54,887	Newport	617,643	512,220	531,00
Enterprise Impro "B"		270,483	1,026,270	North B	ance Mi	ining Compi	any		Peterson Anvil-Palms-		35,529	123,71
Norpac	554	34,448 53,763	243,626 80,805			1952 (738		(511,377)	Keewenaw	694,810	521,241	557,40
Wabigan	112,138	232,159		Blueberry		208,853	213,660	165.828	Plymouth Sunday Lake	223,027 460,959	310,845	304.11 389.11
Section 18 Douglas	64,151	775,389 234,295	1,023,185	Champio Book	n	183,190 128,111	176,786	142,858	Volunteer	134,838	422,155 67,219	97,9
Duncan	874,053	233,446	314,666	Warner		38,674	207,717 140,757	142,858 135,234 150,371	Davidson James	423,385	322,040 158,903	164,5 191,3
Argonne Perry	171,752 338,774	105,770 448,155	19,153 441,159	Oglebay					Buck Unit	638,482	644,649	507.7
Leach	82,262	65,308	4,944	1951 (1	,133,234	1952 (1,	973,263)		Zenith Miller Mohawk			439,2
Carlz No. 2 Harrison	125,441	76,845 45,875	742,559 319,828		(1,045,6		049.067	1 004 065	Rabbit Lake			177,6
North Harrison	175,534	134,485	131,487	Montreal St James	4	1,133,234	948,962 372,259	1,084,865	Fortune Lake			227,0
Halobe Quinn	352,868 4,752	194,916 124,756	206,514 122,306	Canton			651,881		Republic Steel	Corporatio	n	
Harrison Annex Kevin "A"		16,068			Corp.)	ning Divisio		647,784	1951 (2,271,973) 1952 (1	,973,263)	
Kevin "A" Kevin "B"	241,403	101,632 243,152	80,113 313,795			51) 1952 (3			1953 (1,969,6		002 242	1 704 7
Olson	463,632	281,720	514,590	1953	(44,124,	717)	01113011127		Susquehanna St. Paul	999,267 302,862	802,343	+796,2 280,4
Patrick "A"	463,632 471,152 12,909	281,720 421,754 18,275	326,393	Mountai	n Iron	2 020 002	2 - 42 - 700	0 550 550	Stevenson	147,158 529,253	247,226 148,676	156,9
Patrick Annex Patrick "B"	122,884	126,298	27,612 154,546	Mott S.	P. #54	3,820,002	2,643,502 27,052	2,779,579	Penokee Tobin	293,433	408,195 283,957	430,3 305,6
Galbraith	585,803	315,226	230,881	Rouchlea	IU			4 74 7 4 7 7	(+ Susquehans			20210
Galbraith Annex Wyman	198,071	116,318 205,658	253,306	Auburn	Group	6,034,380	4,667,948	6,717,617				
Weggum Weggum South	11,850	74,754	159,795	Spruce	U. G.	247,961	175,668	61,153	Reserve Mining 1951 (O), 195		1053 (191	241)
Longyear	525,894	349,409	437,678	Spruce (Fayal O). P.	2,203,825 756,264	1,504,376 663,535	2,668,482 656,532	Babbitt (Taconi		12,861	
South Agnew	1,364,162	693,058	708,522	Canton		1,972,404	1.596.048	2,650,487 647,783				10010
Agnew No. 2 Pillsbury Addition	359,588	142,368	335,930 16,864	St. Jam Gilbert	55	2,004,399	651,876 1,403,417	2,065,524	Rhude & Fryb			
Pillsbury Addition Patrick "C"			697.519	Burns		399,042	28,158		1951 (331,034)			
Aromac MacKillican			51,409	Knox Sauntry		251,462	248,833	261,519	Pennington Troy	221,019	260,239 121,005	270,4 125,4
Alstead	135,525	28,164	51,409 411,304 100,164	Hull-Ru		298,403	374,975	646,911	Seville	102,906 7,114	39,174	7,7
Feigh Maroco	425,128 95,572 28,447	260,491	120,415	Group Morris C		5,787,727	3,084,116	3,950,841	South Hillcrest Boeing		2,948	300,3
Mangan Joan	28,447	45,152 9,823	26,409 829	Pillsbury	1	260,379 216,821	165,911 177,543 2,315,604	176,006 33,494				20010
Mangan Stai	44.221	16,671		Monroe	Group	3,270,497	2,315,604	3,046,652	Snyder Mining		00 0151 155	
Louise Section 6	2,298 151,587	36,526 165,750	51,366 280,438 599,326	Sherman Godfrey	U. G.	8,556,115 581,847	7,510,531	9,276,467	1951 (1,017,224			
Portsmouth	151,587 492,823	165,750 393,862	599,326	Godfrey Fraser	U. G.	581,847 77,316 297,315	552,005 200,105	646,207 305,945	Webb Shenango	615,567	388,075 129,509	11.1
Rowe Spring Valley	7,738 452,235	2,960 477,546	1,468	Midway	Group	297,315 3,840	170,276	189,206 616,627	Whiteside	1,947	91,651	283,3
Waite		7,277		Pillsbur	Y	66,300	14,796	31,069 225,315	Zontelli Brothe	rs. Inc.		
South Yawkey Mallen		707 52,316	156,900	Niles Dormer			33,259	225,315 914,419	1951 (380,351)		1,315) 195	3 (626,86
		40,797	28,882 32,775 152,344	Sharon			1,728	214,413	Virginia	220,978	131,613	26.1
Snowshoe			152,344 122,673	Iron Ch Sellers	itef		293 76,953		Mangan-Joan	41,669	99,943	225,
South Hillcrest	198,205 583,706	116,122 556,592	270,816 630,423	d'Autrei	nont		3,952		Martin Merritt	5,625 33,781	14,187	15.
South Hillcrest Huntington Bengal-Tully	E02 204	556,592	630,423 655,257	Glen St	ockpile	40,607	69,162		Hillcrest		3,803 75,917	
South Hillcrest Huntington Bengal-Tully Hiawatha	588,700				Group	1,362,440	1,021,826		Gorman		75.917	5.7
South Hillcrest Huntington Bengal-Tully Hiawatha Homer Wauseca	588,949 578,476	435,652 505,891		Arctus	Group	517.013		174,593	Manuel		98 519	200 4
South Hillcrest Huntington Bengal-Tully Hiawatha Homer Wauseca Michigan	588,949	505,891	488,487	Arctus King	Group	517,013	539,345 5,180	174,593 1,897,352	Manuel Graham No. 1		98,518 598	209,4
South Hillcrest Huntington Bengal-Tully Hiawatha Homer Wauseca	588,949	505,891 8,097		Arctus	Group avis-	517,013	539,345	174,593 1,897,352	Manuel	en- 78,262	98,518 598	209,4

mine, the Livingston, into production near Yellow Pine. Bradley also continued regular operation at its Ima tungsten mine and carried out an expanded exploration program aided by DMEA cooperative financing.

In Valley County important black sand (monazite) dredging operations using connected bucket line dredges were carried out throughout the year. Baumhoff-Marshall, Inc. and the Idaho-Canadian Corporation were the largest producers. Jig concentrates of the heavy black sand minerals were shipped to Boise and separated into component parts of monazite, zircon, ilmenite, and magnetite.

magnetite. Production Production of phosphate rock in southern Idaho reached an all time high of about 1,350,000 tons. The largest producer was the Gay open pit mine of the J. R. Simplot Company near Fort Hall. Other leading producers were the Monsanto Chemical Company's open pit mine north of Monsanto; Anaconda Copper Mining Company's surface and underground mine at Conda; and San

Francisco Chemical Company's under-ground mine near Montpelier. Further ground mine near Montpelier. Further expansion is indicated in 1954 as Monsanto plans a second electric furnace.

Phosphate continued to be Idaho's

fastest growing mining industry.

LAKE SUPERIOR

Record Iron Shipments; White Pine Copper Builds on Schedule

The Lake Superior Iron Ranges ended The Lake Superior Iron Ranges ended their 1953 shipping season in November with a new record on the books. Nearly 96,000,000 tons of iron ore were mined and shipped. The Oliver Iron Mining Division of United States Steel Corporation continued to hold the position of leading producer by shipping 44,124,717 gross tons to lower lake ports.

DISTRICT

magnetic separators and other equipment the main point of study.

Oliver Iron Mining Division put the first section of its new pilot plant in operation at Mountain Iron, Minnesota in May, and had all three sections running by late summer. The concentrate from this plant was shipped to the Extaca plant at nearby Virginia for agglomeration studies. tion studie

Interest during the year continued to

be centered on advancements in taco-nite production. During the latter part of the year there was a definite easing of restrictions on visiting and obtaining information from the three pilot plants

now in operation. Free exchange of in-formation between producers is proving helpful to all concerned. Érie Mining Company's operation at Aurora, Minnesota was on a continuous production basis with investigation of

nagnetic separators and other equipment

tion studies.

At Babbitt, Minnesota the Reserve Mining Company's pilot plant continued to produce pellets for shipment to Republic and Armco Steel Corporation's blast furnaces where studies of furnace operation on this new product are being conducted. During 1953 Reserve used shaft type furnaces to make pellets. In the fall they started the installation of a grate type furnace to determine whether it might not be more suitable for this application. The new furnace is expected to be in operation by March of 1954. of 1954.

of 1954.

During the year both Reserve and Erie announced that plans have been completed for the financing of their large scale producing plants. Reserve has set July 1, 1955 as the target date for the first eight sections of its Beaver Bay, Minnesota plant. Erie is planning on a production capacity of 7,500,000 tons by 1957 near Aurora, Minnesota. Work on both of these plants is under way.

While the majority of the tonnage

While the majority of the tonnage shipped during the year required little or no beneficiation, the percentage that required upgrading continued to increase as it has over the past several years. During 1953 over 13 new beneficiation plants were placed in production. New plants now being planned or under construction continue to increase in numconstruction continue to increase in number. Of interest is the return to jigging by a number of the operators after abandoning this practice some years back. There appear to be two main reasons for this reversal: 1) Lower capital cost with lower operating costs than cyclone plants. 2) Improved flowsheets and jigging methods over those used in the past. the past.

The Dutch State Mines cyclone, using the Heavy Media process, continues to be the main instrument for beneficiation of the minus-%-inch, plus-65-mesh frac-tion. Ten cyclone plants are now in operation or under construction.

On the Cuyuna Range the Manganese Chemical Company put its 200 ton per day leaching plant in operation during the year. The first shipment of manganese concentrates was made in December. While a good deal of research and development is still required before continuous production can be maintained, results are reportedly very encouraging.

In Michigan the great majority of iron ore production continues to come from underground mines. Jones and Laughlin Steel Corporation's Michigan Ore Division are completing the surface and underground development (at the Tracy mine) and this important new producer will be ready to ship late in 1954 or early 1955.

DDICOA

"used to destruction - no resharpening"



Liddicoat is the detachable bit that is "used to destruction" and then discarded. The strong connection . . . no threads . . . provides longer steel life and makes the changing of bits quick and easy. No delays, no resharpening, no extra costs.

The new LIDDICOAT "TEE CEE" BIT



Where a Tungsten carbide bit is indicated the TEE CEE is designed for on-the-job interchange with the famed LIDDICOAT bit that is "used to destruction." The sockets of the Liddicoat TEE CEE and USED TO DESTRUCTION bits are accurate to thousandths of an inch, a degree of precision that means a stronger connection and longer bit life. Of prime importance is the strong attachment without threads. Forged within the socket of the bit are flats beween the rounds. Any turning of the rod within the bit sockets tends to tightly lock the bit to the rod, yet it is easily removed with a weighted knockoff block. TEE CEE and USED TO DESTRUCTION bits both fit the same drill steel. For full details, call on us or write.

WESTER Pock Bit Manufacturing Company 552 West 7th South Salt Lake City 4. Utah The Humboldt open pit iron mine and flotation plant operated by Cleveland-Cliffs Iron Company was under construction during 1953 and is expected to go into production during early 1954. Work

into production during early 1954. Work was started on a similar iron flotation plant at Republic, Michigan by Cliffs during the year. Somewhat larger than the Humboldt project, Republic is scheduled for producing in 1955.

The major mine construction project in Michigan during 1953 was the development of the White Pine Copper Company's underground mine. Work is on schedule with operation set for early 1955. A complete new townsite as well as the mill and smelter are under construction. With the initial mill capacity set at 10,000 tons per day there is already some talk of an expansion.

Other Michigan copper producers op-

ready some talk of an expansion.

Other Michigan copper producers operating during 1953 were Calumet and Hecla, Inc., Copper Range Company and The Quincy Reclamation Plant.

The year 1954 is expected to mark a turning point for the Iron ore pro-

Michigan Production of Copper and Iron Ore from 1941 Through 1953

Vear											Copper	Iron Ore*
1941	Ī	Į,	Į						Ī		46,440	15,201,619
1942											45,679	16,129,474
1943											46.764	14,510,357
1944					0						42,421	15,425,788
1945											30,401	11,865,624
1946											21,663	8,756,802
1947					ì						24.184	12,965,48
1948											27,777	12,896,47
1949											19,506	11,199,024
1950											25,608	12,691,10
1951					i						24,979	13,703,90
1952											21,699	11,779,36
19531											24,280	13,200,000

I. Estimated

ducers of the Great Lakes Region. For the first time since the start of World War II production capacity has reached the point where the steel industries de-mand for iron ore can be readily met. While production will continue on a high while production will continue on a high level emphasis will shift to quality rather than quantity. To meet this challenge the mining companies are putting mil-lions of dollars into new plants and equipment, and will upgrade many ores that a year or so ago would have been readily accepted by the steel mills as they were

they were.
The continued growth and expansion of the iron and copper mining industries in the Great Lakes area is a sure ba-rometer to the satisfactory economical in the area looks back on 1953 with satisfaction and forward to 1954 with

MONTANA

Greater Butte Mines 12,000 Tons Daily; Tungsten Mill at Glen

Mineral production statistics compiled by the Montana Bureau of Mines and Geology show that Montana mines pro-duced about 13 percent more mineral wealth in 1953 than in 1952. The largest metallic gain was copper, both in weight and value, which was due to the tonnage produced by the Greater Butte Project of the Anaconda Copper Butte Project of the Anaconda Copper Mining Company and the continued high price of copper. Silver value also increased over 1952 production due to the increased copper production. Silver commonly occurs with the copper ores. Montana Production of Gold, Silver, Copper, Lead, Zinc and Dollar Value from 1941 Through 1953

Year		Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941		246,475	12,386,925	128,036	21,259	60,710	59,181,627
1942		146,892	11,188,118	141,194	20,050	54,715	60,129,853
1943		\$9,586	8,450,370	134,525	16,324	37,606	53,642,658
1944		50,021	7.093.215	118,190	13,105	36.127	49,039,855
1945		44,597	5,942,070	88,506	9,999	17,403	35,405,505
1946	*******	70,507	3,273,140	58,481	8,280	16,770	29,957,206
1947	******	90,124	6,326,190	57,900	16,108	45,679	48,890,964
1948	*******	73,091	6,930,716	58,252	18,411	59,095	56,422,609
1949		52,274	6.327.025	56,611	17,996	\$4,195	49,003,447
1950		51.764	6.590.747	54,478	19,617	67,678	54,956,689
1951	*******	30,502	6,393,768	57,406	21,302	75,888	73,149,813
							70.521.092
1952		24,161	6,138,185	61,948	21,279	82,185	
19531		23,220	6,498,400	79,790	19,630	80,250	75,050,040

1. Estimated

Gold, lead, and zinc production all declined in both tonnage and value due to some mines closing or curtailing pro-duction and the continued low market price of lead and zinc. Lead declined almost 8 percent in quantity and 24 percent in value; zinc declined over 2 percent in quantity and 36 percent in value; gold declined about 4 percent in value; gold declined about 4 percent in

value; gold declined about 4 percent in quantity and value.

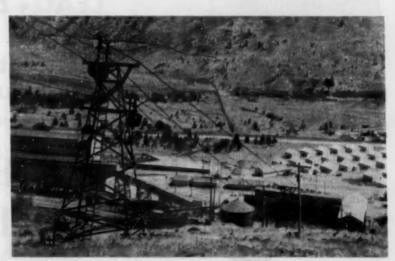
Crude manganese ore production made an increase of approximately 5 percent. The previous quoted production figures combine to show that the major metal value produced in 1953 is 6 percent more than the 1952 value. Although coal production decreased, nonmetallics and petroleum-products production incoal production decreased, nonmetallics and petroleum-products production in-creased. The total of all of these various production figures is the 13 percent in-crease mentioned in the first paragraph. Once again the mines in Silver Bow County (Butte) produced the greatest percentage of metal wealth. The Greater Butte, Project of the Angeonda Copper

percentage of metal wealth. The Greater Butte Project of the Anaconda Copper Company is nearing completion and production is around 12,000 tons of crude ore per day at the year's end. Production is expected to reach 1,000 tons of ore per day in the early part of 1954. A sub-level stoping system is planned for the mining method which planned for the mining method which will use long-hole, percussion drills, ex-tension steel and tungsten-carbide bits to drill holes up to 60 feet in depth. The mine is developed by several adits. Ore is hauled from the portal of the lower adit to the mill by an aerial tram-way. The mill has approximately 100 concentrating tables to produce the chrome concentrate.

chrome concentrate.

Tungsten-bearing minerals are receiving considerable attention by prospectors in Montana. Scheelite and powellite occur in many mining districts. Minerals Engineering Company; Grand Junction, Colorado; built a flotation 'mill near Glen, and is processing approximately 250 tons of tungsten ore per day from the Browns Lake and Lost Creek mines. The Browns Lake mine was taken over by Minerals Engineering from the Alloy Metals Company under the terms of a working agreement. Pony Tungsten Enterprise Company is building a mill and developing the old Strawberry mine, two miles west of Pony, to produce a high-grade scheelite concentrate.

Manganese is the main product of the operating mines in and near Philipsburg with some zinc also being produced. Trout Mining division of American Machine and Metals Inc., Peter Antonioli, and Taylor Knapp Company are the main producers in this area. Several small mines west of Butte and other scattered mines throughout the state are producing crude copper ore per day. The service shaft had been raised to the surface and the service hoist was being installed at year's end. When this is completed, the daily production is expected to increase to about 15,000 tons. Manganese is the main product of the



MOUAT MINE REOPENING was of major importance in Montana mining during 1953. American Chrome Company reopened the mine and rebuilt the 1,000-tons-per-day gravity concentrator under a DMPA contract.

There were few active gold mines in Montana during 1953. McLaren Gold Mines Company's Estelle mines in the New World mining district of Park County closed down and the equipment was liquidated in 1953. There were two dragline-washer plants in operation in Montana during the summer of 1953: One in Henderson Gulch near Hall, and one on Josephine Creek located approximately 25 miles northwest of Missoula. A few scattered small hand-placer operations and hard-rock gold mines were operating during the summer of 1953. 1953

The Anaconda Copper Mining Company contracted the work of constructing a \$45,000,000 aluminum-metal-producing plant at Columbia Falls, Flathead County to Foley Brothers Inc. of Pleasantville, New York. Work was progressing steadily on this project at year's end. Lead and zinc production is small outside of production from the Butte Mines. The Hand mine near Argenta, and the Leahy Leasing Co. in the Corbin-Wickes area north of Boulder produced small, but regular tonnages of oxidized-lead ores. Most of the lead-zinc mines operating in 1952 were forced to mines operating in 1952 were forced to close due to the low metal prices. The American Chrome Company re-

opened the Mouat chrome mine in Stillwater County and were milling ap-proximately 500 tons manganese ores. The largest manganese producers are still the Emma and Travona mines, op-erated by Anaconda in the Butte dis-

Barite is produced by the F. & S. Mining Company at the rate of about 100 tons of crude ore per day from a mine near Greenough. Fluorite is being

produced from an open-pit mine south-east of Darby by the United States Steel Company. The search for uranium company. The search for uranium bearing ores continued with a few small shipments of ore reported during 1953. Phosphate rock production increased to an estimated 479,000 long tons compared with 332,229 in 1952. Underground mines were operated in the Carrison district. ground mines were operated in the Garrison district by Montana Phosphate Products Company and the Victor Carrison district by Montana Phosphate Products Company and the Victor Chemical Works. Montana Phosphate shipped crude rock to Trail, British Columbia for fertilizer manufacture and Victor used its rock in its electric furnace at Silver Bow. Production of talc, gypsum, vermiculite, limestone, and cement, continued at good rates. continued at good rates.

NEVADA

State Sets New Copper Record; **Yerrington Starts Production**

A 35-year Nevada copper production record was broken in 1953. The previous record of 61,397 tons, established in 1917, was bettered by the estimated 1953 production of 62,000 tons. This is an in-

production of 62,000 tons. This is an increase of eight percent over the number of tons produced in 1952.

Anaconda Copper Mining Company started production at its new \$32,000,000 Yerrington plant in Lyon County early last November. Some 35,000,000 tons of copper oxide ore will be mined and leached at the rate of 11,000 tons per day.

The Robinson district, White Pine County, continued to be the major copper producing district in the state. Nevada Mines Division, Kennecott Copper Corporation worked its Ruth and Kimbley pits throughout 1953. Development work continued on the Deep Ruth Project, Kennecott's new block caving mine at Ruth. The new Veteran Pit, west of Kimberly, was started in November of 1953. Ruth. The new Veteran Pit, west of Kimberly, was started in November of 1953 and is estimated to contain some 20,000,000 tons of ore. The planned production from this pit is 5,000 tons per day. Kennecott owns 80 percent of the Veteran and Consolidated Coppermines Corporation owns the remainder. All ore will be mined and processed by Kennecott.

Consolidated Coppermines Corporation, operating in the same general area as Kennecott, also enlarged its activities. Shipment of ore to the McGill concentrator of Kennecott averaged 8,000 tons per day—5,000 tons from Coppermines Morris pit and 3,000 tons from the Ruth pit extension.

pit extension.

Eureka Corporation, Limited at Eureka initiated a drilling program a mile north of the Fad Shaft, (The Fad Shaft, flooded since March 1948, had been a large prosince March 1948, had been a large producer of lead, zinc, and silver ore.) An unknown ore body was encountered at a depth of about 900 feet. It has an indicated thickness of some 12 to 15 feet and the ore appears to be much better in grade than the ore encountered in deep drill holes in the Fad Shaft area. Combined Metals Reduction Company at Pioche operated at capacity until May 1953 when continued drops in lead and zinc prices forced curtailment of produc-

zinc prices forced curtailment of produc-tion. A second curtailment in September virtually stopped lead-zinc production at the company's Caselton mine. This mine

An Unfailing Market for:



GOLD • SILVER • COPPER LEAD . ZINC

Ores • Concentrates • Bullion **Precipitates • Furnace Products**

FOR SCHEDULES, FREIGHT RATES, ETC., WRITE TO YOUR NEAREST OFFICE

ERICAN SMELTING

Tacoma 1, Wash.

San Francisco 4, Calif. 607 First National Bank Bldg. Denver 2, Colorado

700 Pacific Nat'l. Life Bldg. Salt Lake City, Utah

810 Valley Bank Building Tucson, Arizona

P. O. Box 1111 El Paso, Texas

East Helena, Montana

usually produces 60 to 70 percent of Nevada's lead and 80 to 90 percent of its zinc. The company is continuing the mining and processing of manganese, perlite,

and tungsten.

The Pioche Manganese Company, an affiliate of Combined Metals Reduction Company, completed installations of its two electric furnaces at Henderson. Furnace operation started in June 1953. Each of the two furnaces is rated at 7,500 kva and will produce 1,500 tons of ferromanganese per month. Total capacity

romanganese per month. Total capacity is 3,000 tons per month.
Manganese, Inc. continued operations at the Three Kids manganese mine six miles east of Henderson. Construction of a 1,200-ton-per-day flotation plant and calcining and nodulizing kilns were started in 1951 and completed in 1953. In June a disastrous fire destroyed a major portion of the milling plant. Rebuilding of the mill was completed early in 1954.

Getchell Mine, Inc. in northern Humboldt County, formerly one of the largest gold mines in the western United States, abandoned gold mining because of the fixed price of gold and concentrated on producing tungsten. This property is currently producing 4,000 to 5,000 units of 65 percent tungsten concentrate per month from its mices plus a like amount month from its mines, plus a like amount from ores milled on a custom basis. Nevada's nonmetallic mining assumed

Nevada's nonmetallic mining assumed greater importance during the year. Kaiser Aluminum and Chemical Corporation acquired the Baxter fluorspar mine in Mineral County and trucked the ore to Fallon for beneficiation in a new mill which started operation early in 1953. Magnesite, brucite, and gypsum production was maintained at the same level or increased during the year.

increased during the year.

Early in March, Standard Slag Company completed a series of contracts with pany completed a series of contracts with Japanese steel manufacturers involving almost 500,000 net tons of iron ore from mines at Gabbs and Wabuska. Approximately 85 percent of the ore was taken from the Iron Mountain Mine near Gabbs which is still in limited production.

The total value of Nevada's mineral production (metallic and nonmetallic) was \$65,312,000. This was an increase of \$2,364,000 over the 1952 total.

Nevada Production of Gold, Silver, Copper, Lead, Zine and Dollar Value from 1941 Through 1953

Year.		Gold Ounces	Silver Ounces	Copper	Lead Tons	Zinc Tons	Dollar Value
		366,403	5,830,238	78,911	9,623	15,129	38,959,420
1942		295,112	3,723,435	83,663	5,378	10,197	35,840,168
1943		144,442	1.620,280	71,068	4,790	13,647	28,351,601
1044	**************	119,056	1,259,636	61,232	6.605	20,699	27,371,513
EGAR.	**************	92,265	1,043,380	52,595	6,275	21,457	24,186,294
50.42		90,680	1,250,651	48,616	7,175	22.649	27,026,416
1047		89,063	1,337,579	49,603	7,161	16,970	31,366,282
2000		111,532	1.790.020	45,242	9,777	20,288	34,055,480
1040		130,399	1,800,209	38,058	10,626	20,443	29,615,77
1000	*********	178,447	1,537,217	52,569	9,408	21,606	38,181,872
	***********	121,036	981,669	56,474	7,148	17,443	41,280,596
1000	************	117,203	941,195	57.537	6,790	15,357	40.086.740
LOCAL	******				4,500	5,850	42,184,14
19531		102,830	716,860	62,000	4,300	3,830	45,104,14

1. Estimated

Mining operations at the five working properties are similar, but three basic, competitive, refining techniques are used. United States Potash Company employs solution and crystallization. Potash Com-pany of America uses flotation of the salt pany of America uses notation of the sair gangue for ore beneficiation. The other producers employ flotation of the potas-sium chloride values. All operators mar-ket several products which vary in quality, purity, and chemical composition to meet the needs of the agricultural and chemical industries.

Metal mining was hard-hit during 1953. The worst sufferers were the lead and zinc producers. Production of these and zinc producers. Production of these metals during 1953 dropped to the lowest annual level in 27 years. In the last quarter of the year little or no zinc or zinclead ore was mined. The sharp decline in the zinc prices in 1952 closed some of the zinc and zinc-lead mines. A further price drop in 1953 resulted in the closing of the receiving the process has contained in the closing of the receiving the contained in the closing the closest contained in the closest contain

price drop in 1953 resulted in the closing of the remainder by October 1.

The output of copper, principal metal mined in the state, showed a decrease of eight percent as compared to 1952 production. The rise in the price of copper after government controls were lifted, boosted the total value of New Mexico's copper production to \$40,211,600—a record high for the state.

The large Chino open-pit mine of the Kennecott Copper Corporation at Santa Rita produced the bulk of the New Mex-

ico output of copper. Except for a 13-day shutdown caused by a strike and a Labor Day holiday, the company operated con-tinuously all year on a seven-day-per-week basis.

Gold and silver production, nearly all Gold and silver production, nearly all recovered as a by-product from basemetal ores, showed serious decreases. Gold production decreased 12 percent and silver, 57 percent. The total value of the gold, silver, copper, lead, and zinc production for the year amounted to \$44,-241,335. The 1952 total production value of these metals amounted to \$56,559,692. New Mexico's uranium mining expanded during the year. Anaconda Copper Mining Company continued its ex-

per Mining Company continued its ex-ploration and mining operations on the Laguna Indian Reservation east of Blue-Laguna Indian Reservation east of Bluewater. An important ore body, initially located by airborne detection equipment, is now under development. The deposit will be mined by open pitting.

The Haystack Mountain Development Company, wholly owned subsidiary of the Atchison, Topeka and Santa Fe Railway Company continued airling over-

way Company, continued mining opera-tions at its uranium mines near Prewitt.

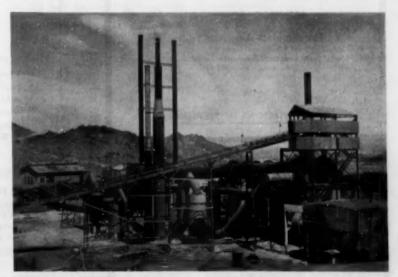
Anaconda completed its new uranium leach plant at Bluewater, and started operations late in the year. Newest of nine uranium recovery plants treating Colorado Plateau uranium ores, the plant uses the caustic leach method for treating high lime ore. Anaconda continued opera-

NEW MEXICO

New High For Potash Production; Pb-Zn Mining Hits 27-Year Low

Nonmetallics provided the bright spot in the state's mining activity during 1953.

The mining and beneficiation of potash took top place in the mining industry. Eddy County produced potash at the rate of 25,000 tons per day of ore hoisted. Total production for the year was well above 8,000,000 tons—an all-time high. Two new companies which entered potash production in 1952 reached full production in 1953. They are the Duval Sulphur and Potash Company and the Southwest Potash Corporation, both in Eddy County, near Carlsbad. The other major producers in the Carlsbad area are the United States Potash Company, Potash Comp the United States Potash Company, Pot-ash Company of America, and the Inter-national Minerals and Chemical Corporation. These five companies have a com-bined production capacity in excess of 50,000 carloads of refined potash salts annually and produce more than 90 per-cent of the United States potash output.



MANGANESE, INC. rebuilt its manganese flotation plant with record speed after a serious fire in June 1953. Concentrate is nodulized and lead is fumed off in the large rotary kiln shown above.

tion of the uranium ore receiving and sampling depot at Bluewater as agent for the AEC. The company's receiving facilities handled ore from a considerable number of independent shippers, as well as ore from Haystack Mountain properties.

OREGON

Hanna's Ferronickel Smelter at Riddle To Be Finished in 1954

There was little change in the low estate of metal mining in Oregon during 1953. However a much better feeling among mining people was in evidence because of the activities in nickel and chrome. The last year for which total value of mineral production was officially reported was for 1951 when nearly \$28,500,000 was estimated by the Bureau of Mines.

Value of gold production increased from \$189,490 in 1952 to \$288,750 in 1953 but was still greatly depressed compared to pre-L208 times. Most of the gold production came from the connected bucketline dredge of the Powder River Dredging Company at Sumpter in Baker County. A minor amount was obtained from a few hydraulic mines and two or three underground mines, the most important of which was the Buffalo mine of R. G. Amidon and Company in Grant County.

A very small amount of copper and lead was produced as byproducts of gold

New Mexico Production of Gold, Silver, Copper, Lead, Zinc and Dollar Value from 1941 Through 1953

Year		Gold Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1941	****************	27.845	1.328.317	73,478	4,668	37,862	25,471,416
1942	****************	11,961	676,170	80,100	4,608	46,461	29,542,885
943	****************	5,563	463,583	76,163	5,723	59,524	34,042,378
1944	**************	6.918	535.275	69.730	7,265	50,727	32,178,026
945	************	5,604	465,127	56,571	7,662	40,295	26,386,781
946	******************	4.009	338,000	50.191	4,899	36,103	26,552,417
947	*****************	3,146	515,833	60,205	6,383	44,103	38,374,269
948	***************************************	3.414	537,674	74,687	7,653	41.502	46,799,570
949	******************	3.240	380.855	55,388	4,652	29.346	31.029.120
950	******************	3 414	338.581	66,300	4,150	29,263	37,437,915
951	*****************	3.050	443,267	73,558	5.846	45 410	54,697,04
952		2.949	479,318	76.112	7,021	50,975	\$6,559,69
19531	*****************	2,600	205,000	70,300	2.800	13,800	44,241,33

1. Estimated

ore shipped to ASARCO's Tacoma Washington copper smelter. Near the end of the year some high-grade copper ore was found at the old Standard mine in Grant County and a shipment was made to Tacoma.

to Tacoma.

Quicksilver was produced continuously in 1953 by the Bonanza mine of the Bonanza Oil and Mine Corporation at Sutherlin, Douglas County. A development loan amounting to \$50,056 was obtained from DMEA with which some new development work was carried on in two lower levels. There was sporadic activity at quicksilver prospects in Jackson, Crook and Grant counties.

Chromite prospecting and mining were active in Josephine County and somewhat less active active in Grant County during months when snow did not block access to mining areas. During the first 10 months of 1953, production of domestic chrome totalled 35,028 short tons

which included production from Montana, California and Oregon. Records are not available of the production by states. The government chromite ore purchasing depot at Grants Pass operated continuously throughout the year and received ore from both Oregon and California.

The most important mining event in 1953 was the start of construction at Riddle, Douglas County, by the Hanna Nickel Smelting Company of plant and facilities for production of ferronickel from the nickel silicate deposit on nearby Nickel Mountain. By the end of the year construction of the smelting plant and the 1½ miles of aerial tramway had proceeded so satisfactorily that it was believed the electric furnaces could be started up in the early summer of 1954. Power requirement will be 65,000 kilowatts. Final product will be ferronickel containing not less than 25 percent nickel and not more than 75 percent iron. The

Be a regular subscriber to

MINING WORLD

with which is combined

MINING JOURNAL

The complete American Edition

U.S., North, South and Central American countries—\$3.00 per year All other countries \$4.00



SUBSCRIPTIONS IN STERLING

Subscriptions in Sterling are accepted from all Sterling areas if sent to P. J. Sergeant, Mining World, 17 Downshire Hill, Hampstead London, N.W. 3, England



Includes Annual Mine Development and Directory Number 13 ISSUES

> Published at SAN FRANCISCO, CALIFORNIA U. S. A.

what does "CP" mean to you?

"CP" means Winslow Controlled-Pressure Elements, with an exclusive built-in system enabling all of your lubricating oil, hot or cold, to get full-flow filtration, even under contaminated element conditions. For this patented protection, look only to Winslow "CP" Elements.



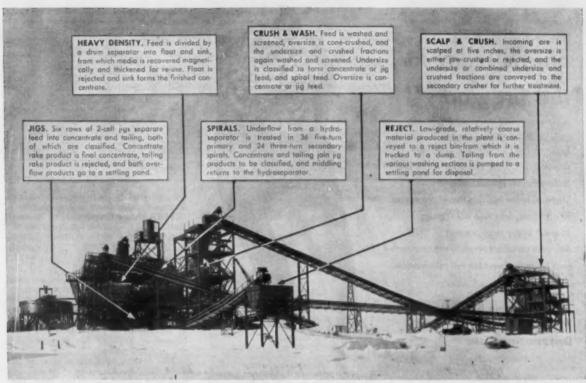
WRITE FOR FREE FOLDER!

Get a complete description of Winslow "CP" Elements. There are no charges or obligations. Just send us your request.



WINSTOW FIGUESS

Winslow Engineering Company 4069 Hollis St., Oakland 8, Calif.



FLEXIBLE FLOWSHEET of the Coons-Pacific Isle iron ore beneficiation plant makes possible the choice

of five concentration methods for Mesabi Range ores. The plant has a capacity of 300 tons of ore per hour.

contract between DMPA and the Hanna companies specifies that the government will purchase from 95,000,000 to 125,000,000 pounds of nickel in the product. Nonnetallics furnished the bulk of mineral production in the state as in the past 10 years. Sand, gravel, stone, and Portland cement comprised more than 90 percent of the value of the nonnetallic minerals. Other commercial nonnetallics were clay, lime, diatomite, quartz, pumice, perlite, shale coal carbon dioxide and semi-precious gem stones.

Demand for aggregate and Portland cement kept plants operating at near capacity until late in the year. There was

Oregon Production of Gold, Silver and Dollar Value from 1941 Through 1953

Vear		Gold Ounces	Silver Ounces	Dollar Value
1941		96,565	276,158	3,576,154
1942		46,233	87,376	1,680,289
1943	*******	1,097	10,527	45,878
1944	******	1,369	20,243	62,310
1945	*******	4,467	10,461	163,784
1946	******	17,598	6,927	621,527
1947	******	18,979	30,379	691,758
1948	*******	14,611	13,596	523,690
1949	******	16,226	12,195	578,947
1950	*******	11.058	13,565	399,307
1951	******	7,927	6,218	283,073
1952	********	5,509	4,037	196,469
19531	********	8,250	6,930	295,022

1. Estimated

probably a levelling-off of the high rate probably a levelling-off of the high rate of construction reported in 1951 and 1952. The Oregon Portland Cement Com-pany initiated a \$1,000,000 expansion program at its quarry and plant at Lime in Baker County. The Ideal Portland Cement Company, with quarry at Marble Mountain in Josephine County and cement plant at Gold Hill in Jackson County, reported modernization work valued at \$200,000 and an annual payroll of \$500,000 with another \$500,000 for plant materials.

The Morrison-Knudsen Company

The Morrison-Knudsen Company started exploration of limestone near Durkee. A railroad siding was built and a crushing plant was installed, Plans for installation of a new burned lime plant at Baker were announced by Anthony Brandenthaler. Pacific Carbide and Alloys Company quarried limestone near Enterprise in Wallowa County. The company also entered the agricultural stone pany also entered the agricultural stone business.

The Bristol Silica Company operated the only quartz quarry and crushing plant in Oregon to produce products used in the metallurgical industry and to supply chicken grit, etc. A new product, cat-alytic silica, was marketed during the vear.

SOUTH DAKOTA

Gold Output Gains; Uranium and Pegmatite Mining Active

Gold and silver production in South Gold and silver production in South Dakota in 1953 was 526,406 ounces of gold and 134,324 ounces of silver as compared to 482,534 and 132,102 ounces respectively in 1952. The Home-stake Mining Company of Lead, oper-ators of the largest gold mine in the United States, produced 1,368,059 tons of ore in 1953 for a total value of \$18,251,984.24 as compared to 1,209

884 tons valued at \$16,379,986.02 in 1952. Improved mining and milling operations were largely responsible for the increase. A modified method of cut and fill mining is now being employed in the mine and in the mill the stamps have all been eliminated and the grinding section greatly simplified. Both of these changes have resulted in large savings in manpower.

A decline in production was reported by the Bald Mountain Mining Company of Trojan, the only other large producer of gold and silver in the state. The pro-duction of this company was valued at \$546,391.60 in 1953 as compared to \$580,612.06 in 1952.

The bentonite production figures for 1953 are not yet available, but it is believed that it will continue to decline. lieved that it will continue to decline. There has been a gradual movement of mining activities into Wyoming as the bentonite deposits of South Dakota are slowly being depleted. The Baroid Sales division of National Lead Company, the International Minerals and Chemical Corporation, and the American Colloid Corporation are the principal producers. Corporation are the principal producers and processors of bentonite.

Pegmatite mining continued very active during the year. The feldspar grinding plants of the Consolidated Feldspar Division of the International Minerals and Chemical Corporation located at Keystone and Custer were in continuous operation throughout the year. The production figures for feldspar for 1953 are not yet available but it is estimated to be between 35,000 and 40,000 tons. This production was obtained from numerous small mines which Pegmatite mining continued ver

always ready for "the fireworks"!

Look to NATIONAL for uniformly dependable fuse. We offer a full line of Safety Fuses, Ignitacord and Thermalite for igniting the whole round at one time, and fuse accessories to meet every requirement. Ask your powder company representative -or write us direct for full information.

Rocky Mountain Distributors: PRIMACORD **Detonating Fuse**



3801 DELGANY STREET . DENVER 5, COLORADO

Ledeen PUTS WINGS ON THEIR CYLINDERS!

If you need a cylinder with 2", 3", 4", 6", 8", 10" or 12" diameter, and

6", 12", 18", 24" or 36" stroke, check with us. We usually have it in stock

and if we ship it air freight tonight, you will have it tomorrow or the

next day. If you need a cylinder with a different stroke length,

we have the necessary components to assemble and ship your cylinder



Cylinders cylinders.

VALVES . CYLINDERS VALVE ACTUATORS AIR-HYDRAULIC PUMPS & BOOSTEE

Ledeen Mfg. Co. Los Angeles 15, Cal

South Dakota Production of Gold, Silver and Dollar Value from 1941 Through 1953

Vear		Gold Ounces	Silver Ounces	Dollar Value
1941		600,637	170,771	21,143,732
1942		522,098	186,937	18,406,363
1943		106,444	35,886	3,751,059
1944		11,621	5,445	410,607
1945		55,948	26,564	1,977,070
1946		312,247	86,901	10,998,861
1947		407,194	111,684	14,359,766
1948		377,850	94,693	13,323,894
1949	*****	464,650	109,383	16,363,011
1950	******	567,996	142,069	20,008,436
1951	*****	458,101	139,590	16,159,871
1952	*****	482,534	132,102	17,008,249
19531		526,406	134,324	18,545,780

1. Estimated

are operated by both the Consolidated

Feldspar and private individuals.

The Lithium Corporation of America, the major spodumene producer in the state, operated its spodumene flotation plant, located at Hill City, continuously during 1953 treating approximately 150 tons of ore per day. The ore for this operation was produced by the company from its three mines located at Keystone, Hill City, and Custer. The Lithium Corporation completed plans to increase the spodumene production by returning its HMS plant to production. This plant located at Keystone has been idle for the past two years.

The spodumene flotation plant of the Black Hills Tin Company of Tinton was destroyed by fire late in the year. This plant treated some 40 to 50 tons of ore per day which was obtained from a company owned mine adjacent to the mill. It is not yet known if the company plans to rebuild. The Maywood Company, the third large spodumene producer in the state operated its famous Eta mine near Keystone throughout the year producing hand-sorted spodumene.

The mica buying station operated by the Federal Government at Custer added to the general activity in the pegmatite mining industry of the state by providing a ready market for not only mica but beryl, tantalite and columbite as well.

as well.

Development and mining of the uranium deposits which were discovered in the southern Black Hill in 1951 was continued during 1953. More thorough investigations by both the AEC and private concerns have indicated that uranium bearing formations almost completely ring the Black Hills and compressed deposits have been found on pletely ring the Black Hills and commercial deposits have been found on the northern edges of the Hills as well as on the southern edges. The northern uranium formations have been found to extend well into Wyoming. The Mining Research Corporation, the Urova Corporation. ation, Ortmayer, Sullivan and Boyle, and Vincent Cord are the principal parties active in the exploration and development of uranium in South Dakota.

UTAH

Utex Mines 52,542 Tons of Ore; **Gold Production Sets Record**

Uranium mining was the highlight of Utah's mineral industry during 1953. The Utex Exploration Company of Moab produced 52,542 tons of ore during the year. The ore averaged 0.454 percent U₈O₈ and

Utah Production of Gold, Silver, Copper, Lead, Zinc and Dollar Value from 1941 Through 1953

Year		Gold Ounces	Silver Ounces	Copper	Lead Tons	Zinc Tons	Dollar Value
1941		356,501	11,395,485	266,838	69,601	42,049	97,796,623
1942		391,544	10,574,955	306,691	71,930	45,543	113,552,848
1943	*******	390,470	9,479,340	323,989	65,257	46,896	124,562,540
1944	**************	344,223	7,593,075	282.575	52,519	38,994	111,036,247
1945	****************	279,979	6,106,545	226,376	40.817	33,630	90.018.641
1946	*******	178,533	4.118.453	114,284	30,711	28,292	60,202,627
1947	******************	421,662	7,780,032	266,533	49,698	43,673	158,624,849
1948	********************	368,422	8,045,329	227.007	\$5,980	41,490	149,763,677
1949		314,058	6,724,880	197,245	53,072	40,670	121,649,828
1950	*********	457,551	7,083,808	278,630	44,753	31,678	159,415,431
1951	*********	432,216	7,310,665	271,086	50,451	34,317	182,897,139
1952	***************	435,507	7.194.109	282,894	50,210	32,947	185,780,497
	***************			269,400	40,400	27,700	193,640,638
19531	**************	477,000	6,700,000	207,400	70,700	21,100	173,090,038

1. Estimated

1.233 percent V_sO_s. Production figures include those of the G, and G. Mining Company which holds a limited lease on a portion of the Utex Mine. The total value of ore produced was \$2,416,350. This includes the \$35,000 AEC production bonus for the first 10,000 pounds of U_sO_s. The production goal for Utex in 1954 is 85,000 tons.

The following in the Big Indian dis-

The following in the Big Indian district are expected to be in production in 1954: Big Indian Mines, Cal Uranium Company, Christensen and Herrin, Little Beaver Mining Company, La Sal Mining Company, and Standard Uranium Company. These companies should produce a combined total of over 1,000 tons a day when all age in production.

when all are in production.

The Utex Exploration Company made application to the AEC for permission to construct a \$3,000,000 uranium process-

construct a \$3,000,000 uranium processing plant near Moab.

Gold production, mostly as a byproduct from copper mining, increased 10 percent during the year and set a new high for the state. The increase was due to improved recovery of gold per ton of copper ore mined and an increase in the quantity of gold mined with other metals. Copper ore still yielded about 91 percent of the total gold compared with 92 percent in 1952. The Utah copper mine of Kennecott Copper Corporation at Bingham was the state's leading gold producer. The state output of copper decreased five percent, but Utah still remained the second largest copper producing state.

On March 30, ore trains at Kennecott's

On March 30, ore trains at Kennecott's open-pit mine started using the new multimillion dollar tunnel that had just been completed on the 5,480-foot level of the pit at Bingham. The 7,042-foot bore will greatly facilitate haulage operations at the mine.

The lead and zinc situation darkened an otherwise good year for Utah mining. Lead production decreased 20 percent and zinc, 16 percent. Over half of the state's lead-zinc mines had ceased operations by the end of the year. Most of the lead-zinc mines remaining active in 1953 operated at a loss.

Two important lead-zinc producers in

Two important lead-zinc producers in the Park City district effected a merger during the year. The Silver King Coalition Mines Company and the Park Utah Consolidated Mines Company, both historic properties, became the United Park City Mines Company. The merger puts about 20 square miles of mining property in the Park City district under control of the company. The mines are mainly inactive, at the present time.

mainly inactive at the present time.

The United States and Lark mines of the United States Smelting, Refining and Mining Company at Bingham continued production of lead, zinc, silver, and copper.

Silver production decreased seven percent during the year. The decline is directly attributable to the reduced production of lead and zinc, from which silver is produced as an accessory metal. Kennecott's copper mine at Bingham was the largest silver producer in the state.

largest silver producer in the state.

The total value of the output of gold, copper. lead, zinc, and silver rose to a new record high of \$193,640,638 compared with \$185,780,497 in 1952, the previous record high.

A new \$250,000 tungsten refinery, constructed in Salt Lake City by the Salt Lake Tungsten Company, began operations in September. The new refinery will utilize concentrates from a mine and concentrator in Glen, Montana and 60,000 ton tailing stockpile accumulated during World War II at the site of the refinery. It is designed to produce 200,000 pounds of WO greatly.

It is designed to produce 200,000 pounds of WO₃ monthly.

The major development in the iron mining industry of the state during 1953 was the launching of extensive exploration programs by both Columbia Iron Mining Company and the Colorado Fuel and Iron Company, Geology department staffs have been increased; every effort is being made to extend present workings in Iron County, and to discover new deposits that will guarantee continued full-scale operation of the steel plant at Geneva, as well as other important steel-making facilities of the West.

A \$5,000,000 phosphate processing

making facilities of the West.

A \$5,000,000 phosphate processing plant was completed early in 1954 by Western Phosphates, Inc. Initial annual output of the Garfield plant will be about 90,000 tons of phosphoric acid, treble superphosphate, and ammonium phosphate.

Two new phosphate mines were developed during 1953. The San Francisco Chemical Company started an underground operation and the J. R. Simplot Company started a surface operation. Both are in the Crawford Mountains near Randolph.

WASHINGTON

Record Zinc Output From Van Stone and Pend Orelile Mines

Zinc mining continued to grow in importance in Washington in 1953. Production of the metal jumped 64 percent from the previous record year of 1952. It was the second consecutive year of advance in the face of discouraging market conditions. Substantially larger quantities of gold and silver also were recovered.

recovered.

Much of the zinc production increase came from the new Van Stone open-pit mine and 1,000-ton flotation plant of American Smelting & Refining Company in the Northport district of Stevens County. In its first full year of operation, the Van Stone became one of the state's leading zinc producers. Output went to the government under a contract for purchase of 36,872,000 pounds of the metal at 15% cents a pound.

In adjoining Pend Oreille County's Metaline district, Pend Oreille Mines & Metals Company increased its output of

In adjoining Pend Oreille County's Metaline district, Pend Oreille Mines & Metals Company increased its output of zinc over 1952 despite a curtailment in ore production starting in September. All zinc concentrates produced in November and December were stockpiled at the mine because of the low zinc price. A third trackless mining unit was installed, raising capacity of the underground mechanized equipment to about 2,000 tons of ore daily and lowering operating costs substantially.

The nearby Grandview mine, oper-

costs substantially.

The nearby Grandview mine, operated under lease by American Zinc, Lead and Smelting Company, and the Deep Creek mine of Goldfield Consolidated Mines Company in Stevens County's Northport district, were other major zinc producers. Mechanization of underground operations at the Grandview was completed during the year. Production was curtailed in September, when



URANIUM EXPLORATION hit an all time high in Utah in 1953 as the true significance of Charles Steen's Mi Vida mine discovery was realized. Here is a dry non-coring percussion drill making test hole.



UNIVERSAL'S

New 3 Ton Diesel Locomotive

for

Surface and Underground Usage

- · Exhaust Gas Conditioner
- Torque Converter
- · Compact Size
- · Power Plus

UNIVERSAL DREDGE MFG. CO.

also Manufacturers of Air Trammers— Conveyors—Bucket Elevators—Dredges

124 Wazee Market

Denver, Colorado



INDUSTRIAL AIR PRODUCTS CO.

on Indair's roster of

industrial gases.

PORTLAND, OREGON • SPOKANE, WASHINGTON MEDFORD, OREGON • YAKIMA, WASHINGTON



COLUMBIAN ALL-METAL BUILDINGS

Strong . Fire-Safe . Low Upkeep

Columbian All-Motal Buildings are increasingly popular with the mining industry because of their unlimited utility value—for warehouses, engine houses, dryhouses, shops, garages, compresser houses, etc. Prefabricated from quality steel. Sectional construction assures easy, low-cost erection. Exceptionally weather-tight. Rigid, strong, fire-safe. Minimum upkeep. Order from distributors listed below—or write direct for complete information.

COLUMBIAN STEEL TANK CO.

P. O. Box 4048-H, Kansas City, Mo.

Distributors in the United States

1400 Seventeenth Street Denver, Colorado Elmto Corporation 34 South 4th West Street Sult Lake City, Utah

Distributors—Fereign Avenids Sjorcite Nacional 458-D Celenie Chapeltapec Merales Mexice, D. F.

EXPERIENCE MAKES THE DIFFERENCE

When you buy and use Coast's Safety Fuse you get a fuse that represents a uniform high quality developed through 87 years of experience. You get a fuse manufactured with the most modern machinery, by men who have had the experience, and who can draw on the experience of the past to give you maximum safety and reliability along with the greatest economy in a safety fuse. Benefit by this experience . . . use Coast's SAFETY FUSE.



COAST MANUFACTURING & SUPPLY CO.

Grandview and Pend Oreille Mines reduced the work week from six to five days. Late in the year, Goldfield Consolidated stopped mining zinc-lead from its Deep Creek mine and shut down its 300-ton Sierra Zinc mill in the same

its Deep Creek mine and shut down its 300-ton Sierra Zinc mill in the same district.

Lead output declined 7 percent to 10,970 tons valued at \$2,918,020, principally because of sharply reduced production from the Bonanza Lead mine in northern Stevens County. After operating the property since 1951, Anaconda Copper Mining Company relinquished its purchase option early in 1953, Most of the lead output was supplied by the Pend Oreille, Grandview and Deep Creek mines. Other producers included the Lead King and Oriole, Pend Oreille County; the Longshot, Young America, Gladstone, Electric Point, Leo Ray, Queen, Red Top United Treasure, Santiago, Lead Trust King Tut, Advance, Old Dominion and Clugston Creek, Stevens County, and the Johnsburg, Skagit County.

Copper production decreased 15 percent to 3,700 tons, worth \$2,116,400, chiefly because of lower output from Howe Sound Company's Holden mine, Chelan County, Alder Gold-Copper Company produced some zinc-copper ore in the first half of the year from its Okanogan County property.

Most of the state's 14 percent gold production increase to 62,400 fine ounces resulted from accelerated output by Knob Hill Mines, Inc., at Republic, Ferry County, and Lovitt Mining Company's Gold King mine at the outskirts of Wenatchee, Chelan County. The Holden mine was the other major supplier. Small producers included Gold Bond Mining Company's Polepick in the old Blewitt district, Chelan County, and the Golden Arrow, Whatcom County, Placer gold recovery was limited to 1.0 ounce, recovered by prospecting in Chelan County.

A 4 percent gain in silver production to 329,700 ounces, valued at \$298,396, was credited largely to the Knob Hill mine. Production value of the five metals totaled \$14,896,835, compared to \$14,-767.054. 767,054 in 1952

767.054 in 1952.

Exploration for base metals slacked off considerably. Grandview Mines of Spokane was most active in this respect, carrying out extensive surface exploration and diamond drilling in northern Stevens County with encouraging results at several locations. Part of the work was under a \$57,400 DMEA contract. Jim Creek Mines, Inc., of Spokane made good progress on a \$47,500 DMEA leadinc exploration project on Jim Creek in

zinc exploration project on Jim Creek in Pend Oreille County's Metaline district. Largest new DMEA contract made during the year went to Attwood Copper Mines, Ltd., a Canadian concern, for \$109,196 worth of exploration, at depth, at the Lone Star mine northern Ferry County, a World War I copper pro-

Big Q Tungsten Mine, Inc., started work under a \$10,200 tungsten explora-tion project_approved by the DMEA at the former Deer Lake tungsten property on the north side of Blue Grouse moun-tain, southern Stevens County. Sunshine Mining Company, Idaho silver producer, set up a mine camp on the south side of the mountain and began tunneling to open promising tungsten surface show-

ings.
Several year-end developments added promise for 1954. Kromona Mines, operating in the Sultan district of Snohomish County, got its new 100-ton mill

Washington Production of Gold, Silver, Copper, Lead, Zinc and Dollar Value from 1941 Through 1953

Year .		Gald Ounces	Silver Ounces	Copper Tons	Lead Tons	Zinc Tons	Dollar Value
1041		84 176	402,030	8.686	3 003	14.320	7.874.886
1042	***************************************	25 106	160 038	8,030	4 851	14 308	8.172.606
1944	**********	45 344	270 333	2 345	F 032	12 203	2 638 013
1943		03,244	370,440	7,303	5,044	14,203	2 405 124
1944		47,277	321,605	0,104	3,823	11,904	7,193,130
1945	*********	57,860	281,444	5,281	3,802	11,693	7,140,247
1946		51.168	264.453	4.527	2.987	11,329	6,886,748
1047	*******************	34 965	293 736	2.240	5.359	13.800	7.313.391
1049		70.075	376 631	5 665	7 147	12 638	11.171.71
1549	*******	71,004	157 050	6 225	6.417	10.740	0 613 30
1949	**********	71,994	331,833	3,6/3	0,417	14 907	12 452 30
1950		02,117	303,300	3,037	10,344	14,807	14,032,304
1951	*******************	67,405	344,948	4,089	8,002	18,189	14,030,884
1952	*********	54,776	315,645	4,357	11,744	20,102	14,767,054
10533		62,400	329.700	3.700	10.970	32,890	14,686,83

1. Estimated

into regular production of copper, gold and silver. Howe Sound Company was granted a government contract to produce 18,700,000 pounds of copper at guaranteed price of 31% cents a pound from its Holden mine, A British Columbia firm, Penticton Tungsten Mines, agreed to take over and operate the old Germania mine in southwestern Stevens County from Tungsten Mining and Milling Company, Spokane,

the symbol of quality for nearly half a century ...



Since its founding in 1908 Anton Smit & Co., Inc. has established a world-wide reputation for excellence, based upon continuing research and improved manufacturing standards.

Whenever you see the famous ASCO trademark you can be sure of highest quality, rigid manufacturing standards and economical cost.

INDUSTRIAL DIAMONDS

Carbons • Bortz • Ballas

DIAMOND TOOLS & WHEELS DIAMOND DRILL BITS

NTON Smit & Co., Inc.

See your phone book for local representative.

Spiral Weld STEEL PIPE

For air, gas, steam, oil and water lines 4" to 12" O. D. • 10-12-14 Gauge 20' & 40' Lengths . Choice of ends Con be supplied to 36" O.D.

HIGH TEST . . . LIGHT WEIGHT **ECONOMICAL LAID COST**

also

STAINLESS STEEL PIPE, FLANGES, ELBOWS NEW ALUMINUM PIPE RECONDITIONED PIPE, VALVES, FITTINGS MODERN PIPE FABRICATING FACILITIES

Send specifications for estimate

PACIFIC PIPE CO.

407 FOLSOM ST. . SAN FRANCISCO 5

If it can be made of pipe . . . We Can Make It



Mineralisht instantly insutes and identifies schoolite. eranium, mercury, zirconium and other hard-to-find minerals opens new, exciting, and interesting worlds of gargeous soiors. You'll find a reasonably-priced Mineralight unit invaluable whether you're prospecting ceriously or as a habby

Ultra-Violet Mineralights are used by hobbyists and engimoors the world over . . . for prespecting, ore-serting, core analyses, mineral displays, industrial inspection, chemieal analysis, and in inhoratory techniques. Long-wave and shart-were sailts.

Write WOW for full information and name of nearest dealer.

ULTRA-VIOLET PRODUCTS, INC. 145 Pasadena Avenue, South Pasadena, California

MINING WORLD

with which is combined MINING JOURNAL

The Production Magazine of the Metal Mining Industry

> Published at SAN FRANCISCO, CALIFORNIA

\$3.00 Per Year 13 Issues

(Includes Mine Development and Directory Number)

WYOMING

Soda Ash from Intermountain Chemical; Uranium Discoveries

Nonmetallic minerals held the spot-Nonmetainc minerals neith the spot-light in Wyoming mining in 1953 as they have over the past several years. Ben-tonite is by far the most important non-metallic mineral with trona production gaining through the completion of plant facilities

facilities.

Bentonite mining and processing constitutes one of the state's most important industries. The amount of bentonite mined in 1953 fell below the 1952 figure of 1,038,077 tons to 949,564 tons. This decrease of 88,513 tons is not a true picture of activity, as large stockpiles are held at the plants from year to year. The known reserves are remaining fairly constant because of increased explorations the discovery of new reserves to tion; the discovery of new reserves re-

place the tonnage mined.

The Magnet Cove Barium Corporation, which now has a bentonite plant near Greybull, mined extensively in that part of the Big Horn Basin, and contributed in an important manner to the state's or the Big Horn Basin, and contributed in an important manner to the state's aggregate production. Some bentonite was mined in the Kaycee area, on the eastern slope of the Big Horn Mountains, but the large reserves there are awaiting development. Bentonite mining in the Rock River area was terminated by the F. E. Schundler Company because of inadequate reserves. The Mineral Mining Company of Cody began bentonite operations during the year, making three producers in the Big Horn Basin.

An adventure that started as an oil well and turned out to be dry has developed into one of Wyoming's most progressive and potential industries. The original hole drilled in 1938, known as the Hay No. 1, marked the discovery of the trona at a point about 20 miles west of Green River, Since that time, additional core drill holes have proved about 30 square miles, in which 250,000,000 tons of trona are estimated to be available.

able. The development of the trona was started in 1947 with a single shaft and a small pilot plant. By late 1953 the Intermountain Chemical Company was shipping about 375 carloads of soda ash per month. The production for the year is estimated to be about 275,000 tons. The present deep underground mine and surface plants to process trona into soda ash represent an investment reported to exceed \$20,000,000. Raw trona, a natural sodium sesquicarbonate, is mined at a depth of 1,500 feet. The plant which went into operation in 1953, converts the sodium sesquicarbonate into anhydrous sodium sesquicarbonate into anhydrous carbonate, or soda ash, Full plant ca-pacity is rated at about 600,000 tons per

wyoming's only phosphate rock mine is operated by the San Francisco Chemical Company and is located near the Idaho border west of Kemmerer. Highgrade phosphate rock is produced by strip mining, and the 1953 production is estimated at 230,000 tons. This is about 65,000 tons over the 1952 production. Although considerable limestone is produced in Wyoming each year, the largest operation and the most unusual is that of the Great Western Sugar Company at Horse Creek, on the east flank of the Laramie Range. Most limestone is produced from quarries, but the Horse Creek operation is an underground mine. Beds of pure calcitic limestone stand vertically and are mined by stoping. During 1953,

some 174,600 tons were mined and utilized principally in sugar beet refining and for limestone aggregate, crushed rock and ballast.

The Sunrise mine in the Hartville uplift of eastern Wyoming, operated by the Colorado Fuel and Iron Corporation, has yielded a high-grade hematite ore with only minor interruptions since 1898. The estimated production for 1953 is 675,-000 net tons of ore.

The old Good Fortune mine, also in the Hartville uplift, in a group of claims located in 1857 and which produced some 5,000 tons of hematite ore in the winter of 1897-1898, was reactivated by the E. C. Schroeder Company. Although the main activity in 1953 was develop-ment work and a testing program with drilling equipment, some mining was started and approximately 55,000 tons of ore were produced during 1953.

The Union Pacific Railroad for several years has been carrying on an extensive exploration program for titaniferous mag-netite deposits in the Iron Mountain area netite deposits in the Iron Mountain area of the Laramie Range, northwest of Laramie. In the fall of 1953, a permanent camp was established to facilitate the program. Magnetometer surveys followed by core drilling have greatly enlarged the known reserves. A railroad survey for a spur from the Union Pacific main line into the area has been completed.

Although uranium miscrals were de-

Although uranium minerals were described from the old Silver Cliff mine at Lusk as early as 1907, little attention was given to uranium prospects in Wyoming

given to uranium prospects in Wyoming until the announcement of the discovery of the Pumpkin Buttes deposits in 1952. More discoveries were made and more development work was done in 1953 than during the preceding half-century. The first uranium production during the present era was by the Homestake Mining Company. The Carlile uranium deposit in Crook County, northeastern Wyoming, was discovered by that company in May 1952, through an airborne radioactivity survey. Subsequent ground work found carnotite deposits in the upper part of the Lakota sandstone. Later work found carnotite deposits in the upper part of the Lakota sandstone. Later in the year the deposits were tested by wagon drilling and mineable ore bodies containing more than 0.2 percent U₂O₈ were found. By January 1953 test mining was under way, and ore has been trucked to the A.E.C. buying station at Edgemont since that time.

since that time.

The Pumpkin Buttes deposits were discovered by Dr. David Love of the United States Geological Survey in October 1951. Private exploration has been carried on pincipally by Jenkins and Hand, consulting geologists of Casper, and by Kerr-McGee Oil Industries of Oklahoma City, Oklahoma, both having employed airborne radioactivity surveys followed by ground checks and wagon drilling. The first ore shipments were made in late 1953.

Toward the year's end, a uranium discovery was made in the Gas Hills area, along the head of Muskrat Creek, on the southern margin of the Wind River Basin, southern margin of the Wind River Basin, about 55 miles east of Lander and 60 miles west of Casper. Newspaper and radio reports precipitated a great rush of prospectors, both local and out-of-state, from practically every walk of life. Since the discovery was made so late in 1953, winter conditions fairly well shut down operations, with the result that only preliminary information is available. It appears that a number of deposits in the region show considerable promise. The uranium miperal is an unusual uranium arsenate.

ITABIRA IRON ORE



VALUE

ANALYSIS PERCENTAGES GUARANTEED BY CONTRACT

Fe (Guaranteed minimum) 68.5
P (Guaranteed maximum) .04:
Moisture (Guaranteed maximum) 1.0

Recent shipments have averaged about .80% Moisture, 69.01% Fe, .028% P, and .27% SiO $_2$. Sizes are half inch to eight inches.

Steel companies now using ITABIRA IRON ORE as charge and feed ore report substantial savings in operating costs. These result principally from hard structure, low moisture, high iron content and absence of impurities. Important reductions in the use of STEEL SCRAP have been achieved in open hearth operations by using higher percentages of ITABIRA ORE in the charge.

Its use in blast furnaces is constantly becoming more widespread. The excellent yields being realized are attributed to the unique properties of ITABIRA ORE.

Inquiries should be addressed to the Vale do Rio Doce Trading Company, 63 Wall St., New York 5, New York.

COMPANHIA VALE DO RIO DOCE S.A.

RIO de JANEIRO

BRAZIL

Lectromelt*

goes to Chile to produce ferroalloys . . .

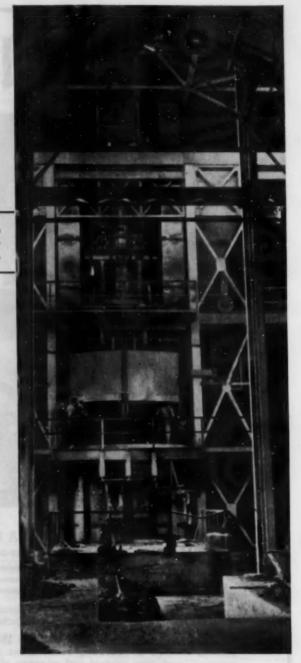
One of the eleven Lectromelt Furnaces in Chile. This Lectromelt Smelting Furnace produces ferroallays at its Chilean installation.

In 35 countries around the world, Lectromelt Furnaces are at work. This international acceptance results from the special care given to the design of each Lectromelt. Plenty of metal goes into the sturdy parts assembled into each unit. Clamps, supporting arms and operating mechanisms are built generously for long life and little maintenance.

For example, to support heavy smelting furnace electrodes, Lectromelt uses as standard equipment a special multi-shoe, readily adjusted, remote-controlled clamp for continuous self-baking electrodes.

It's taken years of experience to obtain world-wide confidence in Lectromelt Furnaces. Take advantage of this furnace know-how when you start thinking about a new electric.

Write for Lectromelt's new Catalog 105 which describes furnaces for smelting and refining operations. Pittsburgh Lectromelt Furnace Corporation, 324 32nd Street, Pittsburgh 30, Pennsylvania.



Manufactured in . . . ENGLAND : Birler, Ltd., Birmingham . . . PRANCE: Stein of Roubeix, Paris . . . BELGIUM: S. A. Beige Stein of Roubeix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbas . . . ITALY: Perni Stein, Genea. JAPAN: Doldo Steel Co., Ltd., Nagoya

*REG. T. M. U. S. PAT. OFF

WHEN YOU MELT... Lectromelt



MINING WORLD



NORTH AMERICA

CANADA

Area . . . 3,690,410 square miles Currency Unit . . . Canadian Dollar Capital Ottawa Value (1953) . . \$100.25-\$100.343 Chief Mineral Products-Nickel, asbestos, gold, copper, uranium, iron, lead, zinc.

Canada hit a new high in volume of metals produced in 1953, but the value was down to \$708,912,835-\$18,991,531 less than that of 1952. The decline was primarily due to the decrease in value of zinc and lead.

Last year ranked as the most signifi-cant in the mining history of New Brunswick, with the announcement of the discovery of the Brunswick Mining and Smelting Corporation's huge base metal-pyrite ore body in the Bathurst area. Within two months after the anarea. Within two months after the announcement, some 30,000 claims had been staked. Results of the Brunswick property drilling program indicate an ore body with a probability of 30,000,000 tons to a depth of 1,000 feet. Average grade is 5.2 percent zinc, 1.61 lead, 0.57 copper, and 0.2 tin, and 1.98 ounces silver per ton. Brunswick's second property, the Anacon-Leadridge, is not property, the Anacon-Leadridge, is not yet completely explored, but indications so far show an important ore body con-taining about 10,000,000 tons to a depth

of 500 feet. Financing and management of Brunswick's two large ore bodies is in the hands of the St. Joseph Lead Company. Present plans call for a mill with a capacity of 4,000 to 6,000 tons, construction beginning sometime in 1955.

In uranium the Blind River-Espanola-Sudbury area aroused considerable excitement with the possibility of a new major field. Thousands of claims have been staked and exploration projects are being planned or already carried on by almost every major Canadian mining company. A claim staking rush also developed in the Marian River area of the company. A claim staking rush also developed in the Marian River area of the Northwest Territories where the presence of uranium ores were detected. Gunnar Gold Mines' remarkable drilling campaign in Northern Saskatchewan led to one of the largest uranium ore bodies ever discovered. Production plans are being rushed with the initial mill to have a capacity of 1,000 to 1,200 tons per day. Another uranium strike on islands in Lake Nipissing near North Bay, Ontario by the Inspiration Mining and Development Company, proved a large deposit of columbium and tantalum as well.

In Manitoba Sherritt Gordon Mines is

In Manitoba Sherritt Gordon Mines is planning for a production of 2,000 tons per day from its new Lynn Lake nickel-copper mine. The entire project represents an investment of over \$40,000,000. During the year, interest continued in Canada's iron ore developments—mainly on the \$200,000,000 program to bring the iron ores of Quebec-Laborador into production; on the Bethlehem Mines Corporation Marmora mine in southeastern Ontario; and on the Inland Steel Company's Steep Rock ore bodies.

Many other new developments took place in 1953, especially in nickel, copper, titanium, gold, and asbestos, with the result that 1954 should be another year of continued growth in Canada's mining.

mining

JAMAICA

Area 4,411 square miles Capital Kingston Currency Unit . . . Pound Sterling Value \$2.80 Chief Mineral Products—Bauxite, gypsum.

The mining of bauxite, commenced in 1952, made good progress in 1953. The total output during this first full year of operations amounted to 1,154,172 long tons (dry basis) as compared with 240,000 tons shipped in 1952. The Jamatcan bauxite is a soft earthy material of terra rossa type, associated with Tetriary limestone and occurring in large surface deposits, filling karst depressions of various sizes. The average composition of the ore won by open pit mining methods is as follows: total A1,0,46 to 51 per cent Fe₅O₂ 17 to 21 per cent, SiO₂ 0.8 to 3.7 per cent, TiO₂ 2.3 to 2.4 per cent, and loss on ignition 26 to 28 per cent. The workon ignition 26 to 28 per cent. The workable reserves so far encountered have been estimated at 150,000,000 tons (dry

basis).

Of the three companies engaged in mining and processing of bauxite, Alumina Jamaica Ltd., a subsidiary of Aluminum Limited of Canada, put into operation its alumina plant at Shooter's Hill at the end of 1952, with an initial capacity of 180

Metal Production and Value in Canada 1951, 1952, and 1953

		530	1	9521	1	9511
Commodity	Quantity	Value	Quantity	Value	Quantity	Value
Antimony [®]	1,530,000	\$ 344,290	2,330,900	8 601,483	6,702,164	8 1,436,713
Bismuth ^d	98,821	197,308	162,373	347,224	230,298	\$43,504
Cadmium ⁸	1.315.989	2,631,978	948,587	2,086,891	1,326,920	3.556,145
Cobalt ⁸	1.754.324	3,772,880	1,421,923	3,226,903	951,607	1,999,612
Copper ⁸	503,224,887	150,631,485	516,075,097	146,679,040	539,941,589	149,026,216
Gold ⁴	4,061,205	139,826,286	4,471,725	153,246,016	4,392,751	161,872,873
Indium ⁶	6,000	13,500	464	909	582	1,368
Iron ore ⁵	6,501,060	42,722,000	5,271,849	33,744,311	4,680,510	31,141,112
Iron ingots ⁵	97,682	3,776,000	32,422	1,815,007	15,554	777,142
Leads	394,458,042	51,969,847	337,683,891	54,671,021	316,462,751	58,229,146
Magnesium and calcium ⁸	********	4,607,633	********	4,812,368		3,618,219
Molybdenite (MoS ₂) ²	152,521	114,390	505,964	409,831	381,956	228,958
Nickel ⁸	287,931,430	160,861,368	281,117,072	151,349,438	275,806,272	151,269,994
Palladium, rhodium,						
iridium, etc.4	161,550	7,396,897	157,407	7,559,109	164,905	7,950,107
Platinum ⁴	134,108	12,237,355	122,317	10,916,792	153,483	14,542,515
Selenium ⁸	356,500	1,312,600	242,030	786,599	382,603	1,239,633
Silver	30,145,259	25,334,503	25,222,227	21,065,603	23,125,825	21,865,467
Tellurium*	16,430	28,758	6,035	10,259	8,913	16,400
Tin ^s	656,000	656,000	212,113	253,581	346,718	494,073
Titanium ore ⁵	4,658	27,566	51	459	1,674	9,790
Tungsten (WO ₂) ²	2,384,554		1,493,111		2,833	7,098
Zinc ³	797,647,860	95,398,683	743,604,155	129,833,285	682,224,335	135,762,643
Total Value Metals		\$708,912,835		\$727,904,366		\$745,588,728

1. Tabulation by the Dominion Bureau of Statistics. 2, Preliminary. 3. Pounds. 4, Fine ounces, 5, Tons

tons per day. The first shipment of alumina was made early in January 1953. The plant was extended to 450 tons daily capacity and has been named Kirkvine Works. Also the deep-sea port and loading facilities at Old Harbour Bay, now named Port Esquivel, were completed to named Port Esquivel, were completed to handle expanded shipments of alumina. About 100,000 tons (dry basis) of bauxite were mined by the company and a total of 31,460 tons of alumina produced, of which 28,731 tons were shipped to the smelters in Norway. In the near future the bulk of the alumina produced will be shipped to the new large aluminum smelter at Kitimat, British Columbia, although shipments will still be made to Scandinavia.

Scandinavia.

The two other companies, Reynolds Jamaica Mines Ltd., and Kaiser Bauxite Company, having already completed their ore-drying and loading facilities in 1952, were actively engaged in mining and shipping of dried or semi-dried ore to the processing plants in the United States, Both companies together exported 1,202,-100 tons of kiln-dried ore, equivalent to 1,054,978 tons of moisture-free ore, Reynolds shipments were sent to its plants at nolds shipments were sent to its plants at Hurricane Creek, Arkansas, and La-Quinta, Corpus Christi, Texas, while Kaiser continued shipments to Baton

Kaiser, continued shipments to baton Rouge, Louisiana.

The development of gypsum deposits, occurring largely in diapiric structures in highly folded Eocene beds in eastern St. Andrew, has also shown further progress. The production being so far on a moderate scale, reached in 1953 the figure of 74,093 long tons of crude gypsum quarried by Bellrock Caribbean Ltd., of which 52,381 tons were exported, mainly to the United States. The rest being con-

sumed locally by the Portland-cement and sumed locally by the Portland-cement and plaster-board industries, or held in stock at the end of the year. Considerable extension of production is in view and large-scale prospecting operations in the main gypsum area north of Bull Bay, about a mile or two from the coast, are in progress. The gypsum is of high quality and the reserves suitable for open-pit mining amount to several tens of millions of tons. Large masses of anhydrite were found to underlie the main growing defound to underlie the main gypsum deposits.

Cave-phosphates and bat-quano were utilized on a small scale, about 2,200 tons being mined at Cousins Cove, Han-over, which were dried and processed to produce 707 tons of dry fertilizer for lo-

Apart from the quarrying of limestone for cement industry, building material, road metal and for lime-burning for the road metal and for lime-burning for the sugar industry, there are no other mining operations at present. About 100,000 tons of Portland-cement are produced an-nually by the Caribbean Cement Com-pany Ltd. at Rockfort, near Kingston. Dolomite and certain types of limestone suitable for metallurgical processes have

attracted some interest.

Minor deposits of high-grade iron ore, Minor deposits of high-grade fron ore, lead and zine, copper and manganese are being prospected by several companies and individual prospectors. The most promising at present appear to be lode deposits of hematite and magnetite, discovered by the Geological Survey. These are associated with the Newcastle Porphyry and metamorphic rocks of the Blue Mountain Series. Some individual describes around to about 1000 000 toos but posits amount to about 1,000,000 tons, but owing to their location and scattered occurrence, problems arise in connection with transport. The old lead and zinc mine at Hope, near Kingston, has been re-prospected and found still to contain workable deposits of ore, suitable for a small mining project when lead and zinc are at higher prices.

are at higher prices.
Oil prospecting rights for the whole island, granted in 1952, are still held by Base Metals Mining Corporation Ltd. of Toronto, Canada. The Geological Survey Department is continuing with the basic survey of the island including the investigations of water-supply potentialities and prospecting for mineral deposits.

CUBA

. 44,000 square miles Area Havana Capital ... Currency Unit Peso \$1.00 Value . Chief Mineral Products-Nickel, manganese, copper, chromite,

Throughout the year 1953 mineral production in Cuba continued at about the same level as in 1952 but with an upward trend in manganese. At year's end be-cause of a price drop in the range of \$6.00 per ton, there has been a cutback

as the marginal manganese producers were forced to discontinue operations. The Minas Guama produced manga-nese from its Charco Redondo deposit

ness from its Charco Redondo deposit near Santa Rita, Oriente, at the rate of more than 20,000 tons per month with a peak of 30,000 tons. The group leads all other producers by a wide margin. The United States Steel interests have undertaken a drilling program and a geologic study of properties in the Bay-amo manganese field. Three drill rigs were active. were active

Cia de Manganeso Oriental Americana, S.A. has developed extensive ore reserves by drilling on the Punopo Group of Claims at Portillo on the south coast, and

are investigating and designing a flota-tion and sintering plant.

Late in the year the Cuban Canadian Mining and Smelting Company started a

Mining and Smelting Company started a drilling program on its manganese properties at Sigua. The group is reported to be developing a chemical process for the treatment of manganese ores.

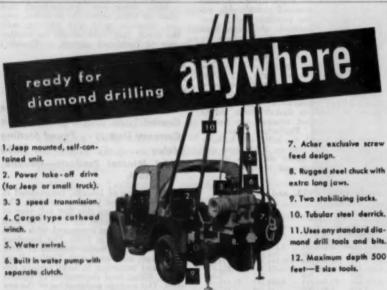
The chrome ore production came essentially from the Cayaguan mine near Punta Gorda on the north coast. Activity in the exploration and development for chrome and manganese ores was at very hrome and manganese ores was at very

chrome and manganese ores was at very high level with several new groups entering the field.

The Freeport Sulphur Company made extensive auger drill tests of nickel ore deposit in the laterites near Moa and started mining a 20,000 ton sample for pilot plant tests in Texas. The operations are being carried out by the Island Exploration Company.

The Nickel Processing Company operator of the United States, government

ator of the United States government owned Nicaro Nickel plant produced 27,-687,966 pounds of nickel concentrate (containing some cobalt) in 1953. National Lead Company controls Nickel Processing. During the year the company increased production, recovered more nickel per ton of ore, and developed new process Improvements during the year. The open pit mines and plant are located at Nicaro on the north coast of Oriente.



- mond drill tools and bits.

The New Model TS Acker Screw Feed Diamond Bit Drill

Here's the latest Acker Time-saving screw feed diamond drill. Ready for action anywhere a Jeep can go. The entire unit is self-contained with power take-off directly from a Jeep or small truck. The extreme partability of Jeep mounting speeds diamond drilling over the roughest terrain.

You save valuable setting up and dismantling time and labor because this Acker is ready to drill the minute it arrives.

Think of ACKER for diamond core drills and accessories.

Write today for Bulletin MW.

ACKER DRILL CO., Inc.

725 W. Lackawanna Avenue Scranton, Penna.

Manufacturers of a complete line of Diamond and Shot Core Drills, Drilling Accessories and Equipment



to better your best production!

Pit a P&H 1055 against any comparable $3\frac{1}{2}$ yd. machine and see how P&H takes over the production lead. And it maintains the pace day after day, under the toughest digging and loading conditions!

P&H years-ahead design and construction make the big difference. You get the extra strength of high-tensile alloy steels to withstand the pounding of repeated shock loads . . the solid stability that lets you exert more power at tooth point. And only P&H has Magnetorque to swing you through five loads to the other man's four. It's the most dependable swing ever built - lasts the life of the machine! Want the same outstanding features in a 21/2 yd. machine?

- 15-25% faster
- 100% free of friction and wear!

*T.M. of Harnischfeger Corporation for electro-magnetic type coupling.

LARGE EXCAVATOR DIVISION

CORPORATION MILWAUKEE 46, WISCONSIN



















Ask us about the companion Model 955A.

LATIN AMERICA

ARGENTINA

Area . . . 1,078,266 square miles Currency Unit Peso Capital Buenos Aires Value \$0.0725 Chief Mineral Products-Lead, Zinc, Beryl, Tungsten.

Highlights of the past year in Argentina were: (1) the initiation of a five-year plan by the state to stimulate growth year pain by the state to summate growth and development in the mining indus-try; (2) increased exploration activities carried on by government agencies and private individuals. The \$240,000,000 government pro-

The \$240,000,000 government program, aimed at making the country more self-sufficient in minerals, will promote development of the state's resources along the following lines.

(t) increase production of amianthus, sulfur, copper, tin, iron, manganese, and the base metals of which several deposits are known but for which the country is now dependent of foreign supplies;

(2) stimulate production for export of mica, beryl, and tungsten;

(3) provide arsenic, barite, bismuth, kaolin, magnesium, and tale in sufficient quantities to take care of internal consumption;

sumption: (4) increase exploration for strategic minerals containing cobalt, chromium, nickel, and titanium.

Yearly production goals to be attained

within the next five years have been set

by the government as follows: sulphur, 40,000 tons per year; manganese, 9,000; lead concentrates, 70,000; zinc concentrates, 90,000; tungsten concentrates, 5,000; arsenic concentrates, 2,500; barite, 3,200; kaolin, 35,000; magnesium, 3,000; talc, 17,000. Financial aid amounting to \$77,000,000 will go directly to mines now in production so that they may re-equip and expand their facilities. Exploration continued at an increased pace during 1953. Search for copper centered in Mindoza, Cordoba, Salta, La Rioja and Eva Peron; geophysical exploration and mining was carried on in Mendoza and Chubut by Military Fabrications, an important governmental division. The same organization supplies iron, sulfur and copper for the domestic market Several investigations are understored.

sion. The same organization supplies fron, sulfur and copper for the domestic market. Several investigations are underway for the production of MnO₂ from rhodochrosite ores of Capillitas and Farillon Negro in Catamarca province. Industrial Bank loans jumped more than 20 percent (to \$54,000,000) to finance mining developments for tungsten have matched. velopments for tungsten, base metals, diatomite, barite, fluorite, mica, ochre, salt, tale, and building materials.

BOLIVIA

Area 416,040 square miles Currency Unit Boliviano La Pax Value \$0.005263 Chief Mineral Products-Tin, tungsten, lead, silver, zinc.

The first complete year of operation of the nationalized mining industry took place in 1953. One more property was taken over by Corporacion Minera de Bolivia, the Ocuri, and negotiations were pending for the Santa Fe group.

Export of tin in ore and concentrates, which accounts for about 80 percent of the dollar credits of the country, increased to 35,394 metric tons in 1953, compared to 32,463 metric tons in 1952.

compared to 32,463 metric tons in 1952 The increase is not significant in view of the fact that mines were shut down and hampered by strikes and revolution in

According to a recent speech by the President of the Republic, the tin mining industry is suffering losses in spite of increased production. Wages are higher, and absenteeism is on the increase. A substantial part of the miner's income is paid in the form of imported foodstuffs and other commodities sold to him below cost. These factors combined with the slipping price of tin did brighten the picture in 1953. It has been estimated that the cost of placing tin on the market was

40 to 55 cents per pound over the market value. During the year, losses are covered by loans from the Banco Central de Bolivia in Bolivianos, in which currency miners' wages are paid. All in all, a conclusion must be drawn that the government has not bettered mining conditions from an economic standpoint.

from an economic standpoint.

Production figures for lead and zinc during 1953 are not yet complete, but it is felt that the output has increased.

An increase in the output of tungsten concentrates took place during 1953, and here the outlook is more favorable. Production of 60 percent WO₂ concentrates is delivered under a contract that runs till 1956, at a base price of \$63.00 per long for unit.

long ton unit.

Gold receipts have been stimulated by paying a higher price and by severe control to reduce sales to consumers and smugglers.

Studies still continue on the possibility of installing a tin smelter. Rich iron ore deposits near the Brazilian border are being explored with a view to their production possibilities.

BRAZIL

Area 3,286,170 square miles Capital Rio de Janeiro Currency Unit Cruzeiro Value \$0.0545 (Official), \$0.02

Developments in the iron and steel, manganese, uranium, tin, and copper in-dustries were the features of 1953 in Brazil.

(Free)

Chief Mineral Products—Iron, manganese, bauxite, tantalite, beryl, quartz mica, scheelite, ilmenite.

Cia Siderurgica Nacional will double its output of steel with the inauguration of a second blast furnace early in 1954 at Volta Redonda. Production for the

country should climb to 1,000,000 metric tons annually with operations at Volta Redonda furnishing about 70 percent of the nation's supply. To care for the ex-panded production of the steel industry. Cia Siderurgica Nacional has increased its coal output.

A second steel plant will be built at Piassaguera in Sao Paulo. The last mill will be constructed in Brazil's coal mining center, Criciuma, Santa Catarina State. Cia. Vale do Rio Doce has under-taken a program to improve its mines and roads in order to increase from ore production for export from 1,500,000 to 3,000,000 metric tons annually.

3,000,000 metric tons annually.

Manganese deposits in Amapa Territory north of Brazil were carefully studied by Industria e Comercio de Minerois S.A. (ICOMI). Geologists estimate that in the region near Serro do Navio there is a reserve of 13,000,000 metric tons of ore with an MnO₂ content varying from 46 to 56 percent. Some of deposits in this area have a thickness of 245 feet and continuous layers of 165 feet are relatively common. relatively common.

relatively common.

Tin imports have been on the increase in Brazil and it was interesting to note the increase in activity in that industry. PRODUCO, Rio de Janeiro started mining operations on the Pioui River, Minas Gerais State, in late 1952; by 1953 a mill had been completed to concentrate 50 metric tons daily of tin-bearing pegmatites. In the Sao Joao del Rei district two companies are mining pegmatite deposits. Cassiterite in this area is found, together with columbite, tantalite and djalmaite. The Fundicao e Mineracao Brasil Ltda, estimates that it has reserves of 40,000 metric tons of cassiterite.

Foreign and Brazilian geologists have been reaking surveys of three conversed.

been making surveys of three copper de-posits and it is possible mining opera-tions on them will be started in 1954. The deposit at Camaqua, Rio Grande do Sul State, appears to be the most promising, containing large reserves of primary copper sulfides. Other ore bodies occur at Caraiba, Bahia State, and at Itapeva, Sao Paulo State.

BRITISH GUIANA

Area 83,000 square miles Capital Georgetown Currency Unit British West Indies Dollar

Value \$0.58 Chief Mineral Products-Bauxite, gold, diamonds.

The British Guiana Consolidated Gold-fields Company continued to be the largest gold producer in British Guiana in 1953 from its connected bucket line gold dredging operations. During 1953 the company recovered 16,375 ounces from company recovered 16,375 ounces from two dredges, the total throughput of the dredges being a record for the company. A new and larger dredge has been pur-chased to work low grade deposits in the Konawaruk area; it is hoped to start dredging in 1955. Work has been commenced on the Tumatumari Falls hydro-electric station which will supply power to all three dredges. Estimated reserves at to all three dredges. Estimated reserves at 31st December, 1953 were 83,000,000 cubic yards. The remainder of the Colony's 1953 gold production, some 4,591 ounces was recovered mainly by hand methods from hundreds of small workings scattered throughout the Potaro, Mazaruni, Cuyuni and North West

During 1953 Demerara Bauxite shipped 1,769,122 long tons of dried ore and 244,900 long tons of calcined ore to Canada, the United States, and the United Kingdom while 58,320 long tons of dried ore were shipped from the bauxite properties at Kwakwani operated by Reynolds Metals Company.

by Reynolds Metals Company.

African Manganese Co. Ltd., working under agreement with Barima Gold Mining, continued to examine occurrences of manganese in the North West District. Operations are focussed on the main deposit at Matthews Ridge, a nine mile long line of hills and ridges, where the workable ore is found, chiefly, as a mantle on the crests or upper slopes.

a mantle on the crests or upper slopes.

Two companies, Columbium Corporation and Morabisi Mining, engaged in prospecting for columbite in the Mazaruni District. The results of the work so far done indicate that the deposits are far done indicate that the deposits are very spotty and that in order to provide sufficient reserves to justify large scale extraction, a much larger area has to be prospected. A geological survey by Barima Gold Mining of the Merume Basin, indicated that the chrome mineral known as Merumite is a secondary mineral derived from Jaepilite and does not occur in workable quantities.

COLOMBIA

Area .	448,794 square miles
Capita	I Bogota
Curren	cy Unit Peso
	\$0.40
	Mineral Products-Gold,
plat	linum.

Gold production for the year 1953, reported to the official Board of Ex-change Control, showed a slight increase over that reported in the year 1952. The over that reported in the year 1952. The increase was due to the mining of higher grade reserves by the large foreign mining companies, as several of the smaller mines were forced to close under continued pressure of rising costs and the fixed price of gold. Among the better known mines to shut down was the Tabano, mine, located in the Department of Narino, which was equipped with a modern 40 ton mill. The mine was operated by United States interests until a few years ago, after which the local owners continued working marginal grade ore on a small scale until that too, was exhausted. hausted

Active preparations for new gold pro-duction were made at the Bombona mine, duction were made at the Bombona mine, located in the Department of Narino under ownership of Mr. Jean Model of New York, New York. At the end of 1953, equipment was arriving at the property for the installation of a modern 25 ton per day mill with smelting facilities for concentrate. A number of small mines that had been abandoned because of the political civil war rampant prior to the 13th of June, when the government in power was overthrown, were put back into proof June, when the government in power was overthrown, were put back into production in the latter part of the year, after peace returned to these outlying areas. A comparison of gold production during the years 1953, 1952, 1953 is shown in the included table.

Asnazu Gold Dredging Limited, which was creating two dredges on the Cauca

was operating two dredges on the Cauca River 25 miles south of Cali, stopped op-erations of its No. 2 dredge and put same up for sale. The company plans to complete the dredging of its remaining gravel reserves in two to four years, using its smaller No. 1 dredge.

Comparisons of Gold and Silver Production in Columbia in 1951, 1952, and 1953

- Item	1951	1952	1953
Total production pure gold in ounces Total production pure silver in ounces Ounces gold produced from alluvial deposits Ounces gold produced from lode deposits Percent produced by foreign companies Percent produced by Colombian companies	446,314 129,100 329,500 100,500 76 24	422,240 123,050 332,000 90,000 77 23	437,200 117,150 (1) (1) 8.

(1.) Not available

In an effort to aid gold producers, in July the Colombian government established a free gold market, permitting private buying, holding, or exportation of gold at free market prices. Foreign currency, i.e. United States dollars, obtained from the exportation of gold was exempted from exchange control regulations. The demand for these "free" dollars in sales of same brought the producer a premium in Colombian currency of approximately 28 percent over and above the official price of U.S. \$35.00 per ounce. Towards the end of the year this premium was considerably reduced as the world free market gold price dropped to within par of the official U.S. \$35.00 per ounce rate, and by the increase in the price of coffee, which adversely affected the premium received by the gold producer, by making more dollars available to the Colombian economy. At the end of the year the premium amounted to approximately 20 percent over and above the official price of U.S. \$35.00 per ounce approximately 20 percent over and above the official price of U.S. \$35.00 per ounce

John Mansville Company of Canada suspended all further exploration work on its asbestos prospects in the Depart-ment of Antioquia. It is reported that although the quality of the asbestos fiber was good, the mineral deposits were too shallow and widely dispersed to permit an economic operation in such an inaccessable area.

The various dredging companies operating in the west coastal district produced approximately 23,000 ounces of platinum. No record is kept of platinum produced by hand panners as most of this metal production is smuggled out of the country to avoid exchange control regulations and thus obtain a higher price, however, it is estimated that approximately 9,000 ounces of platinum were produced by hand panning.

Paz del Rio, the government sponsored iron and steel project under preparation in the Department of Boyaca, neared completion. Company officials advanced the estimated date of initial production to June 1954.

COSTA RICA

Area 19,258 square miles
Capital San Jose
Currency Unit Colon
Value \$0.1764 (official)
Chief Mineral Products-Gold, sil-
ver, manganese, lead.

Nacional Minera, S.A. terminated its

Nacional Minera, S.A. terminated its placer mining operations on the west coast of the Peninsula de Osa and are in the process of liquidation.

Miramar Mining and Exploration Company at its Bonanza property had a small gold production, and at the end of the year was assembling equipment or the year was assembling equipment preparatory to dewatering the lower lev-els of the San Lucas mine, which have been flooded since the middle of World War II. Considerable high-grade ore was taken from these levels just before they flooded and equipment was not available to recover them. It is hoped that they was a sufficient was not

available to recover them. It is hoped that there may be profitable quantities of ore remaining in the area.

Several other gold, lead, and manganese prospects were worked or explored during the year. On placer gold operation on the Rio Tigre, Peninsula de Osa is assembling equipment preparatory to starting operation of a floating dredge of the connected bucket line type.



MARCONA MINING COMPANY became one of the world's important iron ore producers in 1953. Almost 1,000,000 tons of ore was mined, crushed, and exported from company built facilities in southern Peru.

ECUADOR

the first state and and and and	Currency Unit Sucre
Capital Quite	Value \$0.744
Chief Mineral Products-Gold, silver,	sulphur.

The Portovelo mine has been taken over by the Compañia Industrial Minera Associada, an Ecuadorean company, which is working the same veins that the South America Development Company did for 54 years. This company (CIMA) has been able to continue operations with considerable success, grinding and cyaniding 200 tons of ore per day, assaying 0.23 ounces of gold per ton.

The Ecuadorean Mining Corp. S.A., which has been working the Tixán sulphur mines since 1951, is treating ore of volcanic origin, containing 20 percent sulphur, in autoclaves. Daily production has reached 18 tons of refined sulphur, 99.5 percent pure.

The Sociedad Aurifera Nacional is the only gold placer company operating in Ecuador. Established at Estero Hondo at the western base of the Andes Mountains, it is working a gold placer deposit some 60 meters wide as a drift mine. It is able to do this because the roof of cemented clay or volcanic ash stands up well and, with a pay layer on bedrock some five feet thick, the tenor of the ore being some \$4.00 to \$6.00 per cubic yard. Production is some 50 cubic yards per day.

per day.

Recent sulphur explorations on the western Andean slope, 20 kilometers from Otavalo, have located an important cinnabar deposit, an ore which the Spaniards mined in the 16th century on the eastern slope near Azogues. Developments such as this show that modern geological investigation will give favorable results in Fernador.

able results in Ecuador.

EL SALVADOR

Area 13,176 square miles	Currency Unit	Colon
Capital San Salvador	Value	\$0.40
Chief Mineral Products—Gold, silver.		

One of the hardest-hit mining areas of the Central Americas has been El Salvador, the smallest of the Central American Republics, but the largest coffee producer. Along with the soaring coffee producer. Along with the soaring cof-fee prices came new social reforms and increases in wages, and other adjust-ments in living standards which were to be expected as a natural result of the coffee boom. Unfortunately, this had an adverse effect on mining, which was al-ready suffering from the failing world gold market. By the end of 1953 there was but one important mine still operating.

operating.

The El Dorado Mine of the New York & El Salvador Mining Co., Inc., a wholly-owned subsidiary of the New wholly-owned subsidiary of the New York & Honduras Rosario Mining Com-pany, whose gold-silver properties are in the District of Cabañas, terminated op-erations on October 15, 1953. The mine was able to operate for a year after the decision was made to cease exploration and development work. A total of 371 feet of drifts and 769 feet of raises were driven during 1953. A total of 46,203 tons of ore were produced, bringing the production of the mine since its start in 1946 to 297,843 tons. The 1953 output was 14,208.724 ounces of gold and 69,153.24 ounces of silver, with an 86.43 percent mill recovery of the gold and 77.46 percent of the silver. Since the start of operations in 1946 the cost of production at this mine had risen more than 50 percent, due to increases in cost of equipment, supplies and labor. That increase was sufficient to turn an early profit into a present loss. Only an improvement in the world market price of gold, and continued advances in extraction and recovery methods would make this again a profitable undertaking.

Minas Montecristo, S.A. (Inc.), in the District of Morazón is the only mine still operating in the country. A new

still operating in the country. A new shaft was sunk at the property and all of the underground workings were joined, facilitating the drainage by a joined, facilitating the drainage by a central pumping station. Production was somewhat curtailed while this work was being undertaken, but was back to normal by the close of the year. Values are in gold and silver. The straight cyanide mill capacity is 200 tons per day.

FRENCH GUIANA

Area			×		*			3	5	,1	6.5	15		8	q	U	are	mile	5
Capito	ı	1	6	9		9	9		9		9	0	9			9	Ca	yenne	
Chief	1	M	i	n	01	C	ı	1	Pi	ro	c	lu	16	٠		-(Gold	1.	

Some relatively favorable mining prospects were opened in French Guiana in 1953. A very large deposit of bauxite has been found in the Kaw range. Prospecting is underway in the areas of St. Laurent du Maroni and Approuague. Several hematite deposits have been located in the middle Conte District.

The Consortium Guyanais, a French-United States comany, is working a columbite-tantalite deposit at Crique Venus in the Sinnamary region. Seven tons of

in the Sinnamary region. Seven tons of ore assaying 55 percent Ta₂O₅ and 25 percent Cb₂O₅ were exported in 1953. An-

Current	c)	1	L	lr	ıi.	ŧ							Franc
Value												\$0	.0029

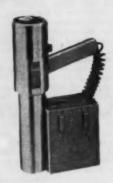
other deposit reportedly has been found at Bagdad near Saül.

at Bagdad near Saui.

A prospecting program for gold has been undertaken by the Bureau Minier Guyanais, both on its own (in the Sauil region, where the Boeuf Mort vein has shown interesting assays) and in rollaboration with the Societe Nouvelle St. Elie et Adieu Vat and the Societe D'Exploitation Miniere de l'Imini. In 1953, 230 Kg. of gold (the same amount as in 1952) was of gold (the same amount as in 1952) was exported. This was produced by the Societe Nouvelle St. Elie et Adieu Vat and by individual miners.

SCINTILLATION COUNTERS

FIND URANIUM 100 TIMES EASIER



MODEL 111 (pictured above) 975.00 FAMOUS HALROSS MODEL 939 AIREORNE OPTIMUM MODEL SAE-7 . 2810.00

ALL TYPES GIEGER COUNTERS ULTRA VIOLET LIGHTS SPECIAL LONG PROBE SCINTILLATION AND GIEGER COUNTERS FOR DELLE HOLES

ENGINEERS SYNDICATE, LTD. 5011 Hollywood Boulevard Hollywood 27, California Olympia 2167



Barber-Greenebecause they are completely standard, and pre-engineered..

that means you save on design costs and erection time!

see your B-G distributor or write

arber-Greene

MINING WORLD

THE ENGINEER'S REPORT

UNITS 21 Buda diesel engines

OPERATION Hauling ore

CONDITIONS Heavy duty—
CONDITIONS 6 years

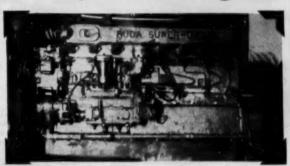
PERIOD Bagdad Copper Corp.,

FIRM Ragdad Arizona.

No stuck rings in 21 engines in 6 years hauling ore!



HAULING 22-TON LOADS up 8 to 15% grades out of the Bagdad Copper Corp. open-pit mine, 21 Buda diesels have had no stuck rings, no clogged ring grooves since using RPM DELO Special Lubricating Oil for



the last 6 years. Engines operate 2 shifts a day, 6 days a week in heavy abrasive dust. Torn down after 7000 hours, all parts in the engine above were exceptionally clean and all bearings were good.



BIGGEST OFF-HIGHWAY TRUCK IN THE WORLD (above) was recently built for Bagdad Copper Corp. It weighs 96,000 pounds, hauls 75 tons. RPM DELO Special Lubricating Oil was also selected for its two 350 H.P. supercharged Buda diesels because of the excellent service Bagdad has had from this oil.

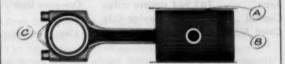


There is an RPM DELO Oil to meet every heavy-duty engine operating condition. FREE BOOKLET on

the RPM DELO Oils gives you complate information. Write or ask for it today.



How RPM DELO Oils keep engines clean and prevent wear



- A. Contain special additives that provide metal-adhesion qualities...keep oil on parts whether they are hot or cold, running or idle.
- B. Anti-oxidant resists deterioration of oil and formation of lacquer...prevents ring-sticking. Detergent keeps parts clean, helps prevent scuffing.
- C. Special compounds stop corrosion of any bearing metal, and oil foaming in both wet and dry sump engines.

STANDARD TECHNICAL SERVICE checked this product performance. For expert help on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write Standard Oil Company of California, 225 Bush St., San Francisco.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso THE CALIFORNIA OIL COMPANY, Barber, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado

GUATEMALA

Area 42,044 square miles	Currency Unit Quetzal
Capital Guatemala	Value \$1.00
Chief Mineral Products-Lead, silver.	zine

The political situation and labor difficulties in Guatemala have seriously hampered the proper development of the Republic's potentially large lead-silver deposits. There are two United States mining concerns that have concessions in the country, but they have been hesitant to invest the sums required to profitably develop and exploit their holdings. This is due to lack of security or guarantee from the government that they can antee from the government that they can operate unhampered by overnight government restrictions or receive a fair backing of the labor courts in any labor contraversies. Until such guarantees are forthcoming there will likely be no significant expansion of operations. Cía, Minera de Huehuetenango com-pleted the construction of its lead mill and smelter during the year, but were and snelter during the year, but were forced to suspend operations, temporarily for the last two months due to an unfortunate fire in the smelter, which partially destroyed this plant. There has been a reorganization of the company and plans have been made to expand plants and operations, and acquire additional acqu

tional equipment.

Cia. Minera de Guatemala continued operations in the Cobán district and shipped appreciable amounts of lead-

Minas de Cromo made several small shipments of high grade chrome ore for use in the refractory industry.

HONDURAS

Area							9	,1	16	50)	square miles
Capit	al		0						9	9	0	Tegucigalpa
Chief	M	i	34	e m	0	11	p.,	0	d		el	-Gold silver

As the year 1953 drew to a close, so did the operation of the oldest continuously-producing mine in Central America—the Rossrio mine of the New York & Honduras Rossrio Mining Company at San Juancito. All that remains is the pulling of pillars, cleaning up scattered small blocks of ore, and shutting down the milling operation. This is expected to be completed by the middle of 1954. The Company is, at the same time, ex-The Company is, at the same time, expanding operations at its El Mochito mine, near Lake Yojoa, in the District of Santa Barbara. Tonnage was increased

Curren	C	y	l	Jı	ni	t		9	9	0		1	Le	mpira
Value									*				*	\$0.50

slightly during 1953, and plans are being made to sink their main shaft to the 1;200-foot level, and appreciably in-crease tonnage. Values are in silver, gold, lead, and zinc. It is hoped that El Mo-chito may eventually replace Rosario in production and profits production and profits.

There was a small gold production from the Yuscarán mine of Mr. Henry Daft. Output is expected to be increased in 1954.

A small amount of mercury was also produced in the country and the operation is continuing.

MEXICO

Area 763,944 square miles	Currency Unit Peso
Capital Mexico City	Value \$0.1156
Chief Mineral Products—Silver, lead,	zinc, antimony, copper, graphite,

Mining problems were intensified during 1953, largely because of the continuing slump in prices of lead and zinc. The Cia. Minera El Boleo, S.A., a French-owned copper enterprise, shut down after 80 years of operation because of rising costs, while American Smelting and Refining Company has indicated a desire to close its Anganueo, Michoacan, silver unit. The fire at that company's Dolores mine last April, resulted in sealing off the southern portion of the mine. Dolores mine last April, resulted in sealing off the southern portion of the mine. The remaining ore is of minor value. At ASARCO's Nuestra Senora lead-zinc-silver property in Cosala, Sinaloa, construction of a 12,000-ton-per-month surface plant, mill, and townsite is practically complete, and a mill to produce acid-grade fluorspar was placed in operation in July 1953 at Encantada, Coahuila, Design work on a lead-zinc mill is in progress for ASARCO's Rosario, Sianloa, deposit.

Sianloa, deposit.

President Adolfo Ruiz Cortines assured mining union officials that the Federal Government will work more closely with the industry to solve current problems. Measures are already un-derway to improve the industry. The government has decreed subsidies in the form of production tax kickbacks of up to 75 per cent as an aid to medium-and small-scale miners.

and small-scale miners.

The government-administered National Railways is improving its freight service with more and better rolling stock and rights-of-way. This is expected to benefit the mining industry as a whole. A \$1,380,000 modern ore wharf is under construction at Tampico, and is expected to be completed late in 1984. is under construction at Tampico, and is expected to be completed late in 1954. The Federal Electricity Commission has announced drafting of plans for supply-ing more power to mining areas. Not all

Mine Production of Metals in Metric Tons in Mexico in 1951, 1952, 1953

Metal	1951	1952	1953
Gold	12.693	14.289	15.037
Silver	1,362.262	1,566,171	1,489,435
Cepper	67,351	58 463	60,148
Lead	225,468	246,027	221,548
Zinc	180,064	227,375	226,538
Iron	312,581	336,838	331,175
Manganese	28,524	45,002	75,738
Antimony	6,825	5,531	3,686
Mercury	279	301	401
Graphite	33,286	24,153	30,331
Tungsten	195	287	408
Arsenic	12,762	2,865	1,998

mining units provide their own electricity and this program will aid many medium-scale operators

dium-scale operators.

There was a marked upswing in sulphur in 1953. Much of the advancement is due to activities of Pan American Sulphur in southern Vera Cruz, especially on the Isthmus of Tehauntepec. Work in the San Cristobal belt on sulphur described in the second to be the control of posits is expected to begin soon. Gov-ernment spokesmen express confidence that Mexico will soon become self sup-porting with regard to sulphur, and should be able to develop and export

NICARAGUA

Area						5	7	,1	4	4	5	9	var	е п	niles
Capito	ıl												M	ana	gua
Currer	10	y	U	ln	iŧ								. 0	ord	oba
Value									\$	0	.1	4	18	offi	cial)
Chief	M	li	16	en	al	F	7	0	dı	JC	ts	-	-G	old,	sil-

Cía, Minera La India, and its subsidi-ary Empresa Minera de Nicaragua, con-tinued normal operations in 1958 with a slightly higher production than 1952, due to a better grade of ore at both mines, despite the decrease in gold prices. Both mines are continuing their exploration and development programs with accounting results.

exploration and development programs with encouraging results.

La Luz Mines, Ltd. completed open pit mining at the mine located at Suina, and transferred all activities to underground extraction while maintaining tonnage at 2,000 per day. Pending clarification of new corporation tax laws and a new Mining Act, relating to labor conditions, the firm temporarily suspended work on the new road to connect the

ditions, the firm temporarily suspended work on the new road to connect the mine with the east coast. Plans for the development of the Rosita copper property have also been suspended.

Neptune Gold Mining Co., an ASARCO property, also curtailed exploration and development due to the new Mining Laws, but production was not affected and was normal for the year.

year.

Cia. Minera del Jabalí, at Santo Domingo, Chontales, continued its development work on a small scale during 1953. Present development is being concentrated on the San Antonio and San Benito veins, where there are several large blocks of ore not yet developed below the 500 levels. A new road is being opened to its San Miguel property, which still remains to be developed. In 1953, 38,523 tons of ore were mined year. erty, which still remains to be developed. In 1953, 38,523 tons of ore were mined compared to 37,477 tons in 1952. Metal content dropped slightly from 0.54 ounce gold and 1.33 ounces silver per ton, to 0.48 and 1.12 respectively.

PERU

Area		4	82	2,	25	8	5	qu	JE	1	e	m	les
Capital .												Li	ma
Currency	Unit	١.			* *								Sol
Value									•		×	\$0	.05
Chief Mir silver, dium,	cop	p	ei	,	b	is	m	U	t	١,		va	na-

For the Peruvian mining industry the year 1953 was one of mixed trends. Total metal production showed an appreciable decline due to the drastic drop in some

base-metal prices, but great progress was made in the construction of new or increased mining and milling facilities. There was a fevered, but productive search for unknown deposits throughout the country.

the country.

As shown in the accompanying table the tonnage of non-ferrous metals produced during 1953 was about 10 per cent lower than in 1952, while the value of total metal production decreased per-

haps 20 per cent.

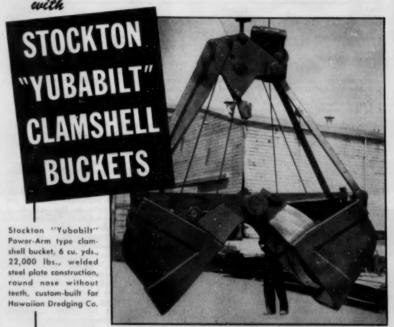
In general the larger companies, with diversified metal products, continued operations at full capacity, although cutting-back somewhat on further investments committed to expansion programs and plant modernization. Many of the medium-sized enterprises decreased the tonnages treated or else mined only their better grade reserves in an effort to lower the extractive costs per pound of metal. Likewise, a number of lead-zinc producers shipped only their lead concentrates and were stock-piling the zinc, since the latter under existing conditions was worth scarcely more than the freight and smelter treatment charges.

The Cerro de Pasco Corporation, by far the largest present producer of metals in Peru, continued operations at Cerro de Pasco, Morococha, and Casapalca. Also the replacement deposit of Yauricocha went on producing some 400 tons per day of copper-zinc-silver-lead-gold-ore with a combined grade-value of about 7 per cent copper. Although production has been suspended for the past few years at the corporation's San Cristobal zinc-lead-tungsten vein mine, exploration was underway during 1953.

Another important producer, the Northern Perú Mining and Smelting Company (a subsidiary of the American Smelting and Refining Company) continued the operation of its older property in the Quirulvilca copper-silver district and of the newly (1952) started Chilete mine, with a daily output of about 250 tons of lead-zinc ore.

Other sizable metal productions were reported by: 1) the Vanadium Corporation of America from its Mines Ragra vanadium mine, in the Cerro de Pasco region; 2) the Compagnie des Mines de Huarón (deposits of lead, zinc, copper, and silver near Cerro de Pasco); 3) the L. J. Rosenshine-managed group: the Volcán zinc-lead-copper mine near Casapalea, the Carahuacra open-pit (zinc-silver), Castrovirreyna (silver-lead) properties, and its four gold mines in southern Peru, San Luis, Capitana, Eugenía and Andaray; 4) the Compañía Minera Atacocha, from lead-zinc mines in the Cerro de Pasco district; 5) Cía. de Minas del Perú, S.A., (Mauricio Hochschild)—at the San Antonio de Esquilache lead-zinc-silver deposit and the Suquitambo gold mine, both in Arequipa department. 6) the Sacracancha, la Virreyna, Huachocolpa, Dorado, and Hualgayoce custom-concentrating mills of the Banco Minero del Perú, a government agency; 7) the Sindicato Minero Rio Pallaga in Junin department (zinc, lead, silver, copper); 8) the Sociedad Minera Yauli (lead-zinc-silver from properties in Lima department; 9) Negociación Minera L.A. Proaño from the Tamboraque lead-zinc-silver mine, near Lima; 10) Fernandini Clotet Hermanos from its Colquijirca lead-zinc-silver deposit near Cerro de Pasco; 11) the Consorcio Minero del Perú from the San Juan de Lúcamas mine (silver-gold-bismuth) near Puquio, and the Calpa gold-silver-copper mine; 12) various companies at Castrovirreyna (zinc-lead-

Dig Everything from Mud to Rock



2 TYPES—California and Power-Arm CAPACITIES—½ to 6 cu. yd.

3 WEIGHT CLASSES—Heavy; Standard; Special Light Weight WEIGHT RANGE—2125 lbs. to 45,000 lbs.

California Type designed expressly for channel and reclamation dredging, has few working parts, well balanced for digging peat soil, river bottom adobe and mud; discharges quickly and cleanly. First built in 1872, produced continuously ever since.

Power-Arm Type built for tough, continuous digging of rock, hardpan, coral and other hard, abrasive materials. Correctly balanced weight and powerful closing action provide exceptional digging ability. Especially suited to close-up work near wharves and on caisson jobs.

Both the California and Power-Arm types are built in all three weight classes:

HEAVY for extra penetration in tough digging.

STANDARD for most dredging jobs.

SPECIAL LIGHT WEIGHT for soft, slushy materials.

Consult us about clamshell buckets. Estimates gladly furnished. Wire, write or call NOW YUBA specializes in the manufacture of Bucket Ladder Dredges Parts Screens Conveyors Hoist Equipment



YUBA MANUFACTURING CO.

Room 710 351 California St., San Francisco 4, Calif.

STOCKTON IRON WORKS

Stockton, California

50

Metal Production of Perú in 1951, 1952 and 1953

Metal	1951	1952	19531
Zinc ⁶	111,663	140,923	110,000
Lead ⁸	90,774	108,101	100,000
Copper ⁸	35,609	34,369	32,000
Vanadium (V ₂ O ₅) ^g Antimony ^g Bismuth ^g	1,290	860	716
	2,885	2,370	1,900
	536	497	500
Tungsten (WOu) ² Silver ⁶ Gold ⁴	311 17,381,093 158,270	386 19,181,672 134,865	17,500,000 120,000

Productions estimated for 1953; no official data yet available. In short tons. First shipment April 30th.

copper-silver), Puquiococha (copper), Sayapullo (lead-zinc-copper), Milpo (lead-zinc), Canza (gold-copper), Cer-capuquio and Millhuacocha (lead-zinc-Julcani (silver-bismuth) Huamachuco (lead-zinc-antimony), Alpamina (lead-zinc), Parcoy (gold), and Buldibuyo

Perhaps the biggest news for the Peruvian mining industry during 1953 was the starting of the country's first important iron ore extraction, with the inauguration of the Marcona project in the southern part of the country.

There, under a 20-year lease from the Peruvian government's Corporación Perusana del Santa, the Marcona Mining Co. (financed by the Utah Construction Company and the Mudd-controlled Cyprus Mines Corporation) have spent \$10,000,000 in proving at least 100,000,000 tons of low-sulphur, 60 percent

iron, hematitic Bessemer ore, and in

iron, hematitic Bessemer ore, and in setting up complete facilities for mining at a preliminary rate of 4,000 tons daily. In addition to the activities of free-lance prospectors and to the intermitent examinations performed by engineers of the various other companies, five strongly financed corporations maintained specialized personnel in Peru for systematic campaigns in the search of metal deposits: Kennecott Copper Corporation; Cerro de Pasco Corporation; Consolidated Guavana Mines Ltd. (conporation; Cerro de Pasco Corporation; Consolidated Guayana Mines Ltd. (con-trolled by Ventures Limited of Can-ada); Mauricio Hochschild, S.A.; La In-dia (subsidiary of Noranda Mines, Ltd.); and the Peruvian units of the American Smelting and Refining Company. Al-though there have been rumors of finds of likely-appearing deposits, no confirmed news can be given regarding these finds until the properties receive actual exploration and development.

SURINAM

Area 55,144 square miles	Currency Unit Surinam C	Guilder
Capital Paramaribo	Value	\$0.531
Chief Minarel Bradusta Bouvita an	14	

Bauxite exports from Surinam set an all time record at 3,276,500 metric tons valued at \$21,300,000 in 1953. In 1952 exports were 3,155,000 metric tons with a value of \$19,500,000.

At the Moengo mine of the Surinam Bauxite Company, Ltd. (Aluminum Com-pany of America) the new plant, consist-ing of four dual-purpose kilns for chemical ing of four dual-purpose kins for chemical and calcined bauxite and additional loading and shipping facilities, was put into service. With a 1953 output of 1,947,500 metric tons, which is 260,000 more than last year, Moengo is now the world's largest bauxite mine. The Cottica River has been dredged to comply with the in-

has been dredged to comply with the increased traffic demands.

The company's Paranam mining activities were shifted, partly to the new Rorac development on the East bank of the Surinam River. Rorac supplied some 100,000 metric tons, Total Paranam production amounted to 581,500 metric tons, which is 208,500 less than in 1952. which is 298,500 less than in 1952.

Billiton Co., Ltd. steadily increased the production of its Onverdacht mine to 747,500 metric tons, 160,000 more than last year. At the drying and calcining plant, situated at Smalkalden, a third kiln was put into service. The Onver-dacht mine is now Surinam's second larg-est bawite produces. est bauxite producer.

Kennecott Copper Corporation, a new-comer to Surinam, finished its bauxite prospection near Moengo. Various new bauxite prospecting licenses, spread all over the coastal area from east to west, have been granted to the Surinam Bauxite Co., Ltd.; the Billiton Co., Ltd.; and the Guiana Exploration Co., Ltd. (i.e. Kenne-cott). Reynolds Metals Co. also showed a renewed integer in Surinam hauxite. renewed interest in Surinam bauxite.

The Geological and Mining Service finshed its baxuite prospection on the Nas-sau Mountains. Preliminary estimates con-cluded a reserve of somewhat more than 10,000,000 metric tons dried basis, of good grade ore and some additional mil-

good grade ore and some additional millions of lesser grade ore.
Gold shipments totaled 6,450 ounces, which is slightly more than last year. Sara Creek Goldfields, Ltd. shipped the most, 3,708 ounces. The Company enlarged its mechanized production. Surinam Gold Mining Co., Ltd. steadily organized its small 20 ton plant near Kilometer 124.5 of the Paramaribo-Kabel railroad.
Billiton Co., Ltd. finished various prospecting work. The occurrences of asbolecting the prospection of the pros

lan near Brokopondo and pegmatite min-erals near Rama on the Surinam River, and of cinnabar near Bonnidoro on the Marowijne River were investigated. None of these prospections seem to have war-ranted further development by the company. The Rama pegmatites have since been worked by a small local company, which extracted some 1.6 metric tons of beryl (10 to 12 percent BeO).

Baker Company, which showed some interest in the occurrence of platinum near the Upper Marowijne River, gave up further investigation for the time be-

African Manganese Company, Ltd. started prospecting for manganese ore in the area Southeast of Kwakoegron. The Geological and Mining Service located an occurrence of tungsten ore about 50 miles South of Paramaribo.

VENEZUELA

Area	330,000 se	uare miles
Capital .		Caracas
Currency	Unit	Bolivar
Value	\$0.29	85 (official)
Chief Mi	neral Products—	-Iron, gold,

During 1953 more from ore was produced and exported from Venezuela than in any previous year. Production of from ore in 1953 by the Iron Mines Company of Venezuela, a subsidiary of the Bethlehem Steel Corporation, amounted to 2,297,024 metric tons. All of this came from the rich deposits of El Pao, some 80 miles east of Ciudad Bolivar.

The most important developments in Venezuela during 1953 were made by the Orinoco Mining Company, a subsidiary of the United States Steel Corporation. Orinoco has spent over \$1,000,000,000 devel-

noco has spent over \$1,000,000,000 developing its rich iron ore deposit, Cerro Bolivar. The first shipload of iron ore from Cerro Bolivar arrived in the United States in January 1954. This marked the begin-

Production and Exports of Iron Ore in Metric Tons by the Iron Mines Company of Venezuela

Year		Production	Exports
1950		. 199,951	
1951		. 1,269,611	- Mariento
1952		. 1,969,000	1,906,673
1953	**********	. 2,297,024	1,972,743

ning of an annual shipment of 5,000,000 tons, later to be expanded to 10,000,000 tons

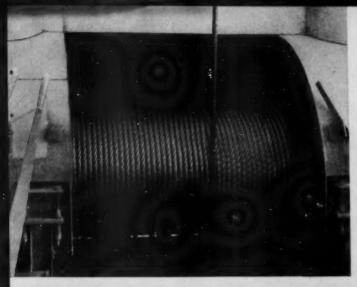
tons.

In addition to exploration and mining, Orinoco has constructed a 90-mile railroad and highway from the mine to the Orinoco River; erected an ore-loading dock on the river; dredged the Orinoco River and its delta channels to gain access to the sea; built a town at both the mine and port, complete with schools, hospitals and other civic structures. For more information on these Orinoco operations see Mining World, December 1953, page 50, and March 1954, page 51.

Raulte Exports and Gold Shipments From Surinam in 1951, 1952, and 1953

Company	Mine	Grade	1951	1952	1053
Surinam Bauxite Co., Ltd.	Moengo	BAUX Metal Chemical	1,214,500 54,000	Metric tons 1,645,000 42,500	1,864,000 45,500
	Paranam	Calcined Metal Calcined	853,000 63,000	830,500 49,500	38,000* 535,500 46,000
Billiton Co., Ltd.	Onverdacht	Metal Chemical	449,500 40,000	551,500 36,000°°	747,500**
Total Bauxite Exports				3,155,000	3,276,500
Sara Creeek Goldfields, Ltd.		INC ITE	GOLD	3.335	nces 3,708
Surinam Gold Mining Co., L. White Water Mines, Ltd. Others	id.			302 431 2,162	374 304 2,064
Total Gold Shipments				6,130	6,450

^{*} Calcining startted in August. **Including small lots of calcined bauxite.







OVERCOMING ABRASION—Wire rope takes a beating on some jobs by abrasion. It is squeezed in multiple layers under tremendous pressure on rotary drilling drums in the Texas oil fields. In the Northwest it drags under heavy logs.



In this Arizona mine it is scraped over rocks to operate a slusher. Everywhere it is rubbed severely on winches that do not wind smooth. Under such conditions Red-Strand 6 x 19 Seale wire tope will last longer and save you money.

What can <u>you</u> do <u>better</u> with 6x19 Seale Red-Strand?





6 x 19 Seale has the same strength and weight as the more frequently used 6 x 19 Filler Wire, but the arrangement and size of the wires is different. You can see in the diagrams that the outer wires are fewer in number and larger in size. They provide high resistance to abrasion and greater wearing quality with somewhat less flexibility.

It's the perfect rope for certain jobs. Would it solve a problem for you? Be less trouble? Save more money? A Leschen man is near you. Perhaps he can help. Leschen is providing longer-than-expected wire rope service to industry everywhere.

Send for the 64-page Leschen Wire Rope Handbook. It describes Seale and all other Red-Strand wire rope constructions.

LESCHEN WIRE ROPE DIVISION

The Watson-Stillman Company
(A SUBSIDIARY OF H. K. PORTER COMPANY, INC.)
St. Louis 12, Missouri



EUROPE

AUSTRIA

Area 32,360 square miles	Currency Unit Schilling
Capital Vienna	Value \$0.03827
Chief Mineral Products—Iron, magne	esite, antimony, lead, zinc, copper.

The overall mining production for 1953 exceeded the level achieved during 1952, and brought about an all-time high for certain minerals.

Most important of Austrian ores, iron ore production rose from 2,652,588 metric tons in 1952 to 2,756,630 metric tons in 1953. Of this 1,757,620 metric tons were 1953. Or this 1,757,020 metric tons were mined in open-pit operations. To meet increased iron ore requirements, mechanization at the Styrian ERZBERG (Ore Mountain) was stepped up. Special interest was devoted to the transportation system in the open-pit and in the shaft-mining sections, where a trackless transportation method was inaugurated. The production level is set at 8,000 metric tons of one per day. tons of ore per day.

Austrian Production of Ores, Minerals, and Metals in Metric Tons in 1951, 1952 and 1953

Commodity	1951	1952	1953
Iron ore—total Iron ore—from	2,369,672	2,652,588	2,756,630
open pits Lead-zinc ore	1,613,160	1,735,860	1,757,620
Lead concentrate Refined lead	6,229	7,193	7,063
Zinc concentrate	9,800 6,883	8,758 8,619	11,102 8,715
Copper conc.	84,168 6,237	135,105 9,405	162,720 10,728
Electrolytic coppe Bauxite	8,407	6,438 15,180	8,590 17,735
Aluminum Magnesite	21,324 664,024	36,706 742,259	43,476 804,716
Pig iron	1,049,438	1,172,711	1,321,905

Lead-zinc ores were mined by the Bleiberger Bergwerke Union (Bleiberger Mining Union and Kreuth (Carinthia Province). The 1952 figure of 150,311 metric tons of ore was exceeded by a production of 152,636 metric tons in 1953. A number of lead-zinc mines were closed during the year. Future interest is centered on the Lafatsch mine in the Tyrol, operated by the Bleiberger Berg-

werke Union, where underground drill-ing is scheduled.

The production increase for lead metal was based on the increased collection surrender of waste and scrap lead within Austria, and the processing of lead concentrate from the Italian Raibl mine. This accounts for a volume of 3,265

mine. This accounts for a volume of 3,280 tons of lead, which was re-exported to Italy after processing.

While about 400 copper deposits are known in Austria, the majority of them are not mineable. The copper mine of Mitterberg near Muehlbach, and the neighboring mine of Buchberg (both in the Twal) copy words over with a second control of the copper mine of the copy of the c the Tyrol), each produce ores with a copper content of 3,000 tons. Another important mine, near Kitzbühel, in the

Tyrol, was still in the phase of extensive geological study. The Mitterberg mine enlarged and modernized its plant. Ca-pacity of the mill rose to about 450 metric

pacity of the mill rose to about 450 metric tons of ore per day.

The production of bauxite, divided in about equal parts between aluminum-bauxite and milling-bauxite, was 17,735 tons during 1953. While the majority of bauxite is processed for use in the two aluminum plants in neighboring Bavaria (West Germany), production of aluminum metal reached 43,476 metric tons. The aluminum mill at Ranshofen was forced to reduce output to three pot lines during the winter months, to adjust to the availability of electric current. The Lend aluminum works concentrated activities during 1953 on becoming independent of outside electric supply. Based on the enlargement of the existing hydroon the enlargement of the existing hydropower plants, and the construction of another new plant, the Lend works reached 78 percent self-sufficiency in electric cur-

rent requirements.

Magnesite production also increased during 1953 with 804,716 metric tons

CYPRUS

Area 3,584 square miles	Currency Unit Pound Sterling
Capital Nicosia	Value \$2.80
Chief Mineral Products—Copper, pyr	

The activities of the principal mining concerns on the Island are summarized below.

Cyprus Mines Corporation is an entirely American-owned undertaking operating mining properties. The Mavrovouni mine output during the year 1953 amounted to a total of 681,652 dry long tons as compared with 743,560 dry long tons in 1952. Particulars of the production during the years 1952 and 1953 are given below:

Commodity	1952	1953
Copper concentrates ¹	100,003	73,181
Cement copper	2.273	1,883
Cupreous pyrites!	122,362	111,844
Gold in Cu concentrates	8.838	6,951
Silver in Cu concentrate		63,434
Flotation pyrites1	457,921	422,970
1. Dry Long Tons. 2.	Fine Ounces.	

The Skouriotissa, Mathiati and Apliki

82

properties were not operating during the

properties were not operating during the year, but the exploration program at the Apliki and Mathiati lease areas, initiated in 1951, was carried on during the year. Hellenic Mining Company Ltd. holds a total of 42.55 square miles of mining leases in the areas of Kalavassos-Asgata, Mitsero-Agrokipia and Kambia-Sha. An average of 1,374 workers were employed and production of copper bearing pyrite amounted to 167,492 tons against 197,018 tons in 1952. Exports of pyrite were as follows in comparison with 1952.

Destination	1952	1953
W. Germany United Kingdom Holland Switzerland Italy	110,957 tons 40,656 34,723 9,999	82,254 tons 25,663 25,303 4,990 10,857
Total	104.225 tone	140.047.400

Open pit operations in the Mitsero-[World Mining Section—58]

Agrokipia mining lease involved the removal of about 85,000 tons of over burden and in the Kambia-Sha mining lease of about 214,000 tons. The company also holds 35 prospecting permits. Extensive geophysical surveys were undertaken in the mining lease and prospecting permit areas during the year. Geological surveys were also carried out in prospecting permit areas. ing permit areas.

ing permit areas.

Gypsum & Plasterboard Co. Ltd. is a subsidiary of the Hellenic Mining Co. Ltd. and produces crushed gypsum rock (127,903 tons in 1953) for export as well as plaster, plasterboard and gypsum blocks for the local and the foreign market.

kets.

Cyprus Asbestos Mines Ltd. has a lease over practically all the asbestos bearing area of Cyprus. Mining operations were carried out during the dry months of the year from April to November. During the working season of 1953 a total of 1,782,459 tons of rock was quarried against 1,842,403 in 1952. This tonnage yielded 440,750 tons of raw material compared with 467,678 tons in 1952. Recovery of marketable asbestos fibre from this ore amounted to 15.880 short tons

covery of marketable asbestos nore from this ore amounted to 15,880 short tons against 18,250 in 1952. The Cyprus Sulphur and Copper Com-pany Ltd., Limni Mines, Polis, Cyprus, is a subsidiary of the Esperanza Copper The Cyprus Sulphur and Copper Company Ltd., Limni Mines, Polis, Cyprus, is a subsidiary of the Esperanza Copper and Sulphur Co. Ltd. During the year this Company shipped 32,180 tons of cupreous pyrites to Continental buyers. A 500 ton per day concentration plant was partially completed and preparatory stripping operations were carried out for the opening of the Limni Pit operations. Various workshops, offices, stores and staff quarters were constructed.

The Cyrpus Chrome Company Ltd. of Ayios Nikolaos, Cyprus, operated the chrome ore mine on Troodos to a depth of 120 meters and produced during 1953 10,000 tons of crude ore, and 15,000 tons in 1952. The ore was refined at a concentrating plant below the mine and of the products: 3,700 tons of lumpy ore and 3,100 tons of concentrates were exported compared with 4,160 tons and 5,960 tons, respectively, in 1952.

EIRE

Area		27	,000	square	miles
Capital					Dublin
Currency	Unit			Erie	Pound
Value .					
Chief Mi				s—Lead	l, zinc,

In spite of the low metal prices prevailing in 1953 the three small lead-zinc mines in Eire continued operations. Underground mining at the Abbeytown Mining Company, Ltd., in County Sligo was discontinued as it was found more economical to obtain all production from the open pit workings, Milling was continued at the rate of 300 tons per day with the ore grade being about 1.0 percent lead and 2.5 percent zinc. Production of concentrates was about 100 tons of lead and 250 tons of zinc per month. An assay of the zinc concentrate dis-An assay of the zinc concentrate dis-closed the presence of 400 grams of germanium per ton. Ways and means were sought to separate and recover this valuable metal.

Operations at Silvermines Lead and Zinc Company in County Tipperary were confined to the lead mine as it proved uneconomic to treat the oxidized zinc ore

at the prevailing zinc price.

In County Wicklow, the Wicklow
Mining Company installed jigs to treat
the lead-zinc ore. Previously this had been treated on a toll basis at a neighboring mill.

Mianrai Teoranta, a government spon-sored concern at Avoca proved some 7,000,000 tons of copper-lead-zinc-py-rite ore and considered the advisability of erecting a 1,000 ton per day mill.

FINLAND

Area .					1:	3	6	0	5	4	50	41	10	ire	n	nil	es
Capita	1.					*								H	els	sin	ki
Curren	cy	U	n	it									F	in	nn	na	rk
Value												4	\$0	0.0	04	13	48
Chief																	er,

The year 1953 was a period of encouraging activities on all fronts for the mining industry in Finland. In many instances, record breaking production resulted. Late in 1953, the wheels began to turn at the Otanmäki iron-titanium mine. At the Vihanti zinc mine of the Outokumpu Company, development con-tinued. When completed, this mine will become one of the leading zinc producers in Scandinavia.

The total production of the Outokumpu Company's six mines was 1,047,500 tons of ore in 1953, which is a new record.

The products of the concentration plants include:

83,000 tons of copper concentrate; 250,000 tons of copper concentrate; 250,000 tons of pyrite concentrate; 7,000 tons of nickel-copper concentrate; 6,500 tons of zinc concentrate; 500 tons of arsenic concentrate; 400 tons of lead concentrate; and 20 tons of tungsten concentrate

At the Outokumpu mine some surface buildings including the headframe, crushing plant, concentrator, change house and shops around the new Keretti were under construction. buildings as well as the rest of the surface facilities will be completed in 1954.

Two mine hoists, friction drive type,

are going to be mounted in the cylindri-cal top of the headframe. One of them will be for a cage with a counterweight, and the other for two 5-ton skips. The crushing plant is located in the upper

Production Figures For The Haveri Mine of The Vuoksenniska Company in 1951, 1952 and 1953

Product	1951	1952	1953	
Ore milled ¹ Gold recovered ²	114,923 309	122,000 380 160	143,734 325 291	
Silver recovered ² Copper in concentrate ¹	175	197	457	

1. Metric tons. 2. Kilograms.

part of the adjacent cylindrical tower. There will be four 5%-foot Symons cone crushers, two in series with a screen be-tween. A 6,000 tons ore bin is directly

below the crushing plant.

In the Vihanti zinc mine most of the building program was completed during 1953. The erection of machinery is under

The expected annual capacity of the Otanmäki concentrator is 600,000 tons of ore from which 175,000 tons of magnetite concentrate, 75,000 tons of ilmenite concentrate and 5,000 tons of pyrite concentrate are to be separated. During the

last months of 1953, 68,000 tons of ore last months of 1953, 68,000 tons or ore was milled in trial runs. From this, 16,-700 tons of magnetite, 3,140 tons of ilmenite and 475 tons of pyrite concentrates were produced. Magnetite is separated by magnetic separators, the other minerals by flotation. Full production is scheduled to begin early in 1954.

FRANCE

Area .				2	12	,6	5	9	9	q	U	01	re	miles
Capita	١.									*				Paris
Curren	су	U	nii											Franc
Value													C	0.0028
Chief pote tune	sh	,	ire											uxite, pyrite,

The record figures achieved by the French iron and steel industry in 1952 were not maintained in 1953. The slight decline in production brought it back to the 1951 level. Pig iron production in 1953 was 8,664,000 tons as against 9,769,000 tons in 1952 and 8,750,000 tons in 1951. tons in 1951.

Production of steel Production of steel in 1953 was 9,995,000 tons as against 10,867,000 tons in 1952 and 9,835,000 tons in 1951. Of the 152 blast furnaces in France, 89 were active at the end of 1953.

French production of iron ore rose slightly in 1953 (42,368,000 tons, as against 40,716,000 in 1952 and 35,137, 1000 in 1951).

against 40,716,000 in 1952 and 35,157,000 in 1951). The export of ore remained constant at 9,925,000 tons, about
the same as in the two preceding years.
The production of aluminum pig con-

tinued to increase in 1953, reaching a total of 112,100 tons, nearly twice as much as that produced in 1950 (60,700 tons). The two producing companies are Pechiney (92,400 tons) and Ugine (19,700 tons). Exports amounted to 45,000

The mining of bauxite continued to increase, amounting to 1,250,000 tons,

as against 1,114,900 tons in 1952, and 804,000 tons in 1950. A quarter of the production (\$15,000 tons) was exported. The production of lead concentrate (65 percent lead) remained about the same (19,000 tons in 1953—19,380 in 1952), despite the closing of the Blaymard mine at the beginning of the year. The production of lead bullion continued to rise slowly (56,000 tons in 1953—51,500 tons in 1952—and 48,000 tons in 1951). The two smelters are the Noyelles Godault and the Estaque. About as much lead is imported each year as is produced, but Algeria and Morocco are supplying an increasing percentage. In 1953, their shipments to France amounted to 50,000 tons as against 43,300 tons in 1952, while imports from abroad fell by about the same amount (2,600 tons in 1953), as against 10,800 tons in 1952). tons in 1952).

tons in 1952).

The quantity of zinc sulphide concentrate (50 to 55 percent zinc recovered decreased slightly (24,000 tons in 1953—29,200 tons in 1952). This was due in part to the shutting-down of the Blay-

part to the shutting-down of the Blaymard mine.

The production of slab zinc has continued its slow but steady rise (82,000 tons in 1953–80,100 in 1952–76,600 in 1951). Imports, which have sometimes almost equalled domestic production, have recently been decreasing in proportion to the increase in domestic output. Only 20,000 tons were imported in 1953, as against 44,800 tons in 1952. 1953, as against 44,800 tons in 1952.

There has also been a slow but steady increase in the production of pyrite (325,000 tons in 1953–294,100 in 1952–280,600 in 1951–and 146,000 in

While the production of tungsten ore has risen from 875 to 1,000 tons annually, the production of the ores of anti-mony, copper, and tin has been almost negligible. The Cie. des Mines de Deze negligible. The Cie. des Mines de Deze closed down its antimony mine in April 1953, after having taken out 800 tons (as against 1,180 tons in 1952). The shut-down of the Charrier mine in July stopped the production of copper ore (60 tons) and limited the production of tin



MINING IN NORTH WALES centers at the Halkyn United Mines, Ltd. One of the company's shafts, headframe, crushing plant, and concentrating mill are shown here. The firm mines and concentrates lead ore.

ore to 750 tons. Thus, France is almost wholly dependent on foreign sources for its tin and copper needs. The production of antimony metal was

maintained at about the 1952 level, (1,500 tons in 1953-1,720 in 1952), due to the treating of Algerian ores. The Palais plant produced electrolytic copper, partly from imported non-refined metal and also from scrap. Its annual production remains between 16,000 and 17,000 tons. 17,000 tons.

17,000 tons.

The Ugine Company's Pombliere plant produced 120 tons of cobalt metal in 1953, as against 266 tons in 1952. The Societe Le Nickel's refining plant at Havre converts the mattes (77 percent nickel) from New Caledonia into oxides and refined nickel. Its 1953 production was 3,200 tons, the same as in 1952, while in 1951 the figure was 4,800. This decline is due to the increased produc-

tion from the company's furnaces in

tion from the company's furnaces in New Caledonia.
In 1953, the following metals were also produced: 1,100 tons of magnesium, 130 tons of cadmium, 50 tons of bismuth, 45 tons of silver, and 1,200 kilograms of gold. The latter comes from the Salsigne mine where the ore also contains silver, copper, assentic, and his-

the Salsigne mine where the ore also contains silver, copper, arsenic, and bismuth. The Salsigne mine was expected to close down completely at the end of 1953, as a result of the low price of gold. However, it is being kept open provisionally by government support.

The production of potash salts in 1953 was 6,300,000 tons, equal in terms of K₅O content to 1,030,000 tons, these figures being about the same as in 1952. It is expected that the average daily production will increase from 23,550 tons (1953) to 28,500 tons within three years. (1953) to 28,500 tons within three years. In terms of K₂O, exports were 550,000

tons in 1953, as against 473,000 in 1952. The manufacture of potassium chloride amounted to 800,000 tons, the same as in 1952.

in 1952.

The Canari mine on the island of Corsica produced 9,000 tons of asbestos fibers (6,320 in 1952). The production of powdered talc also showed a rise, from 89,600 tons in 1952 to 105,000 in 1953. On the other hand, there were declines in the production of barite (24,000 tons in 1953–28,000 in 1952), fluorspar (55,000 tons in 1953–56,200 in 1952), phosphate chalk (80,000 tons in 1953–102,000 in 1952), sulphur ore (300,000 tons in 1953–383,500 tons in 1953–and the sulphur extracted from this ore (11,000 tons in 1953–17,600 in 1952). The Malvezy mine, which produced and treated this sulphur ore, closed in 1953.

GREECE

Area 50,300 square miles Capital Athens Currency Unit Drachma Value .. \$0.0000333 Chief Mineral Products-Bauxite, chromite, pyrite, zinc.

After a long period of war, invasion, and occupation, only during the last few years has Greece been in a position to develop unimpededly its mineral deposits. Financial aid granted under the Mar-shall Plan in 1950 has permitted pre-war shall Plan in 1950 has permitted pre-war mines to reorganize, while formation of the Institute for Geology and Subsurface Research (with the assistance of the Mining Branch of the American Mission in Athens) has led to systematic geologi-cal and geophysical exploration of the

During 1953, drilling was undertaken on several nickel-iron deposits, and de-velopment soon followed. Installations are being constructed for the ore dressing

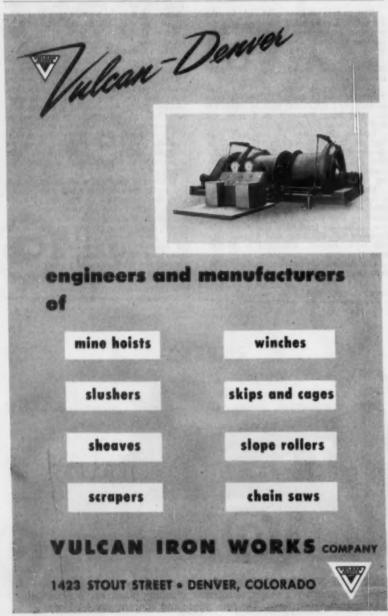
are being constructed for the ore dressing of 400,000 tons annually of nickel-bearing iron ore assaying about 2.0 percent Ni+Co content, and about 50 percent Fe in a mixture containing about 4.0 percent Ni+Co. It is expected that this project will start production in 1954.

During 1953, four chromite mines started operating in central Greece and two in northern Greece, producing 30,000 tons of refractory-type chromite ore. The Institute proceeded with prospecting in the mountainous area near Kozani, northern Greece, where exploration delimited the mountainous area near Kozani, north-ern Greece, where exploration delimited about 1,000,000 tons of ore containing 20 to 25 percent (Cr₂O₂) which is amen-able to concentration by washing. The Hellenic Mines Company and the United States Defense Materials Procurement Agency have signed a contract for further exploration of the area, as well as expan-sion of the washing plant exected by the exploration of the area, as well as expan-sion of the washing plant erected by the company last year for production of 140 tons of chromite concentrate daily. Also, in 1953, the Greek Mines Company

Mineral Production of Greece in Metric Tons for 1952 and 1953

Commodity	1952	1953
Bauxite ¹ Pyrites Iron ore Chromite ¹ Barite Zinc concentrates Lead concentrates Emery Antimony one	284,913 194,652 158,254 32,162 21,502 9,061 5,554 6,000 2,803	304,000 225,134 86,326 30,100 27,054 11,157 6,400 8,000

1. 1953 production estimated.



started construction of a washing plant in the area. It is hoped that both plants will begin operation this year. Total bauxite production in 1953 was 400,000 tons, compared with 350,000 tons

in 1952. In the current year, it is planned that bauxite mines on Mt. Parmassus will be developed and an alumina plant established.

The large iron pyrite mine of Kassandra in northern Greece increased prosandra in northern Greece increased production of iron pyrite concentrate from 200,000 tons in 1952 to 230,000 in 1953, and it is expected that this production will remain stable for several years.

Various small deposits of manganese ore doubled their production in 1953, which in 1952 had totaled 20,000 tons.

In the Laurium district, Mediterranean Mines Inc. is still producing lead and zinc. The annual rate after milling at two flotation plants, is about 6,000 tons of lead and 10,000 tons of zinc concentrate.

trate.

On the islands of Milos, about 20,000 tons of barite are produced annually, and on the island of Naxos about 10,000 tons of excellent quality emery. Greece also produces small quantities of iron ore, alluvial gold, and antimony ore.

EAST (SOVIET) GERMANY

Area 42,000 square miles Currency Unit Ostmark (East Mark) Value \$0.45 equals 1 East Mark, government rate. Chief Mineral Products-Iron, cop-

Iron ore production in 1953 is estimated at 1,180,000 metric tons, compared to 892,000 tons in 1952. Steel production is expected to increase from the

2,052,000 metric tons produced in 1952 to 2,300,000 tons for 1953.

After the World War II, reconstruction and development of the heavy industries made slow progress, until three years ago when the Soviets set up a government for East Germany and immediately ordered high production levels. Since then production of metals and minerals has been steadily increasing.

ITALY

Area 119,800 square miles	Currency Unit Lira
Capital Rome	Value \$0.0016
Chief Mineral Products-Mercury, py	rite, sulphur, lead, zinc.

Provisional figures for Italian mine and smelter production during 1953 give a rather varied picture: in some branches significant advances were obtained, in other, unfavourable market situations reduced production to a lower level than

duced production to a lower level than in the previous year.

Iron ore production showed a marked increase, especially in the first half of the year; in the second half, a slackening of the demand by blast furnaces brought output at the mines back to the level of 1952. About one-half of the increase in production over 1952 was from the Sardinian mines (Nurra and S. Leone), where output increased eightfold and development work continued.

velopment work continued.

The lead-zinc mining industry main-

zano provinces had to maintain production in order to supply the new electrolytic zinc plant at Nossa (Bergamo) which worked near full capacity most of the year. Output of crude, low-grade, calamine (26 percent zinc) mined only in Sardinia and used locally for zinc and zinc oxide, decreased by 12 percent from 54,800 tons to 48,200 tons.

54,800 tons to 48,200 tons.

Flotation of calamine in a few plants in Sardinia and in the Gorno (Bergamo) plant was underway, producing concentrates assaving 38 to 40 percent zinc at the rate of about 20,000 tons per year.

Smelter production of lead, and zinc metal showed noticeable increases over

1952; zinc production was the highest on record.

Italian Metal and Mineral Production in Metric Tons in 1951, 1952, and 1953

Commodity	1951	1952	1953
Bauxite	174,014	282,912	269,674
Antimony ore	4,537	4,478	2,585
Iron ore	4,537 552,855	790,237	933,375
Manganese ore	52,721	81,190	77,481
Lead conc.	64,375	64,665	65,168
Zinc conc.	212,822	234,411	222,232
Asbestos fiber	22,612	23,941	20,397
Barite	76,541	56,274	69,319
Fluorspar	41,019	59.125	76,270
Pyrite	898,186	1,141,417 236,439	1,223,310
Sulphur	214,340	236,439	223,077
Talc	75,996	80,336	80,282
Aluminum metal	49,751 418	52,830	55,462
Antimony metal	418	413	233
Lead metal	36,000	34,931	37,994
Zinc metal	47,409	54,851	60,033
Mercury ¹	53,800	57,740	53,100

1. Flasks.

tained output with lead concentrate production practically constant and zinc concentrate production decreasing only by a small percentage. No important mine was shut down but manpower engaged in lead-zinc mining decreased by 15 percent, owing mainly to a drastic curtail-ment of exploration and development work. Sardinia accounted for 65.5 percent of zinc concentrate output and 89 percent of lead concentrate output. While zinc concentrate production in Sardinia decreased by 10 percent from 1952 it increased by 13.6 percent in contributed leads to the fact that tinental Italy, due partly to the fact that the Sapez mines in Lombardy and BolAntimony ore, and metal production was at a very low level. A mine in Tus-cany was shut down and the Gerrei group (Sardinia) operated well below cancelity. canacity.

Bauxite production showed a slight decrease, partly due to labor disturbances and was, as formerly, obtained for the greatest part from two mines in Puglie; a small production was also from a mine in a new field in the province of Caserta. Imports of bauxite from Yugoslavia declined from 200 000 tons in 1952 to declined from 200,000 tons in 1952 to about 100,000.

Production of primary aluminum increased 5 percent and the four reduction plants worked most of the year, when electric power was available, at full ca-

pacity.

Mercury ore, mined at five properties in the Monte Amiata area, was of a slightly lower grade than in previous years so that while the tonnage treated was greater, the metal production declined by 8 percent. New furnaces were being built at one of the mines.

being built at one of the mines.

Pyrite production reached a new high exceeding the previous peak of 1952 by 7 percent. No new producer appeared in the field and the bulk of the output came from the group of mines in the province of Grosseto, where a second flotation plant recovering pyrite from tailings was put in operation during the year. Some interesting indications were discovered by drilling in the Monte Argencovered by drilling in the Monte Argentario area.

The year was bad for sulphur producers in Italy; sales on foreign markets were almost nothing and heavy stocks piled up in the warehouses of the government spensored sales organization (Ente Zolfi

Mine Production in East Germany in Metric Tons For 1951, 1952, Jan. to Sept. of 1953, and Production Goal For 1953

Commodity	1951	1952	1953 (JanSept.)	(Prod. Goal)		
Lead concentrate ¹ Tin concentrate ² Copper ore Pyrites Iron ore Potash salts ² Coal Lignite	2,608	2,620	2,380	3,220		
	303	416	463	600		
	996,500	1,065,000	1,038,000	1,365,000		
	102,400	136,000	187,000	230,000		
	592,400	892,000	938,000	1,180,000		
	1,638,500	1,803,000	1,538,000	1,910,000		
	3,416,500	3,525,000	2,014,000	3,120,000		
	158,640,300	172,884,000	108,676,000	177,500,000		

1. Lead content, 2. Tin content, 3. K2O content.

Smelter Production in East Germany in Metric Tons For 1951, 1952, Jan. To Sept. of 1953, and Production Goal For 1953

Commodity	1951	1952	1953 (JanSept.)	(Prod. Goal)								
Copper (refined) Lead (refined	28,700 16,800 321	\$2,400 18,100 572	32,000 16,000 562	47,000 23,000 710								
Pig iron	402,500 1,537,400	573,000 1,808,000	942,000 1,416,000	1,200,000								

Italiani). Production was, however, on the increase in Sicily as the program of the increase in Sicily as the program of modernization and re-equipment of some important mines began to get under way. In the other main producing area (Marche-Romagna) there was a very marked decrease. One of the oldest and biggest mines had to carry out a drastic reduction in output and manpower as the ore reserves were nearing exhaustion. Fluorspar production rose again to an all-time peak of 76,000 tons. In the recently discovered deposits of Sardinia output increased by 80 percent and at a mine in the Lombardy Alps a new flotation plant was put in operation at the

tion plant was put in operation at the beginning of the year to increase the supply of acid grade material. Exports, mainly to the United States, were about 45,000 tons.

LUXEMBOURG

Area									,	9	9	9	1	50	qı	31	a	re	miles
																			bourg
Curren	16	y	1	Jr	ı	ř	*			*									Franc
Value																	×		\$0.02
Chief	N	Ai	n	01	o	ı	1	P	10	0	lu	10	9	_	-	le	0	n.	

The only mineral mined in Luxem-The only mineral mined in Luxembourg is iron ore. The deposits occur in the basins of Esch and Differdange, along the French border. This is the northermost extension of the famous Lorraine iron ore deposits. Production in 1953 was 7,169,647 metric tons compared with 7,244,870 tons in 1952.

Three companies are engaged in the

Three companies are engaged in the iron-steel industry: (1) Société Anonyme des Acières Réunies de Burbach-Eich-Dudelange (ARBED), (2) Société Ano-

nyme des Hauts Fourneaux et Acières de Differdange, St. Ingebert-Rumelange (HADIR). (3) Société Minière et Métal-lurgnque de Rodange. Steel exports represent about 90 per-

Steel exports represent about 90 percent of the total export value of the country. Luxemburg, with only 30,000 inhabitants ranks eighth in the world in steel production, and on a per capita basis, ranks first.

THE NETHERLANDS

Area		15,764	square miles
Capital			. The Hague
Currency	y Unit		Guilder
Value .			\$0.2632
Chief M		Produc	cts—Salt, ce-

Royal Netherlands Salt Industry produced 30,000 tons more salt in 1953 than in the previous year, viz 450,000 tons and 420,000 tons in 1952. Exploratons and 420,000 tons in 1952. Exploration of the salt deposit near the harbor of Delfzyl, was performed by the Netherland Oil Company, for the Salt Industry. The results were very encouraging and a concession was applied for. It is planned to mine the salt by dissolving it and to pump the brine to Delfyzl by pipe line. A caustic soda plant is to be erected at this harbor, in cooperation with the government at a cost of 50,000,000 to 60,000,000 guilders. Kempen Zinc Company yielded profits of F.3,265,000 in 1952 against F.3,040,000 in 1951. The company exploits a smeltery at Budel in North Brabant, but all the ore has to be imported. The Royal Netherlands blast furnaces

saw important extensions of its plant at saw important extensions of its plant at Ymuiden in 1953. A new rolling mill for the production of thin sheets and tin plate came into production, as well as an extension of the open hearth shop. This shop has been newly rebuilt and contains 5 open hearth furnaces of 200 tons capacity each. In consequence the steel production is being raised from 200 000 tons capacity each. 300,000 tons annually to 600,000.

NORWAY

Area						1	2	4	,9	8	14		51	qı	U	a	re	miles
Capito	1													*				. Oslo
Currer	16)	,	U	n	it							*						Krone
Value														*				\$0.14
Chief	M	i	ne	er	a	1	P	r	0	d	u	ci	s		-	ŀ	0	n, py-

Norwegian production of iron ore made a tremendous gain in 1953 when A/S Sydvaranger came into full production during the year.

Aluminum output of 55,600 tons may be increased by another 2,000 tons in 1954 with the start of operations at Sunndalsora in west Norway. It is hoped that full capacity of 40,000 tons annually will be attained in 1955.

Also in 1955, the new iron smelting plant, Norsk Jernverk A/S, is expected to begin production and its output may double Norwegian pig iron production.

double Norwegian pig iron production.
Geological and geophysical surveying is continuing in the northern and southern parts of the country, followed by intensive exploration and development mining in some of the ore fields. Metals and minerals sought include iron, pyrite, copper, zinc, lead, graphite, dolomite, and quartz. and quartz.

Norwegian Production of Metals and Minerals in Metric Tons

Commodity	1951	1952	1953
Iron ore*	440,000	773,000	1,182,700
Ilmenite ore		118,000	128,100
Pyrite ore†	700,000	714,000	740,200
Copper ore	23,000	23,300	25,000
Zinc ore	12,000	12,000	11,300
Lead ore	-	690	870
Molyhdenum ore	210	195	212
Copper	3,500	3,400	4,000
Copper (Skjaersten)	15,000\$	14,000\$	13,250
Sulphur**	100,000	100,000	103,000
Graphite	3,500	4,100	-
Pig iron (electric)	Sections		55,400
Aluminum	-		55,600

Includes titaniferrous ore. †About 300,000 tons of pyrite ore containing chalcopyrite smelted for copper and sulphur production. ? About 35 per-cent copper. 4 About 15 percent copper. ** In-cludes production from pyrite.

PORTUGAL

Area 34,386 square miles Capital Lisbon Currency Unit Escudo Value \$0.034542 Chief Mineral Products-Tin, tungsten, pyrite, copper.

The Beralt Tin and Wolfram Ltd. continued to be one of the most impor-

Area										9	9	9	1	50	41	J	21	re	miles
Capito	al						,							L	u	×	e	m	bourg
Currer	16	y	1	U	ni	Ŷ	*			*									Franc
Value																	*		\$0.02
Chief	N	Ai	n		re	ıl	1	PI	re	00	lu	16	9	_	-	le	0	n.	

SPECIFY

LEXIPIPE the quality ventilating tubing





Bemis Bro. Bag Co. 111 No. 4th St., Box 23,

St. Louis 2, Mo.

Flexipipe is now available with Rope Seam Suspension at no additional cost. The newest, best, quickest suspension . . . eliminates special accessories and suspension wires . . . all you need is a noil. It equalizes strain on the tubing.

Flexipipe is efficient, serviceable, economical. Jute and heavy-duty grades available in a variety of lengths and diameters to meet your requirements.

Write for complete information and sample.

[World Mining Section-62]



Precision design, sound manufacture and long use have made Galigher equipment the recognized standard in mills and laboratories concerned with the diversified problems of metallurgy. Whether the job is exploration, experimentation or streamlined plant production, these seven tested tools meet every academic and practical demand.

Galigher equipment . . . coordinated with Galigher engineering, covers the entire field of ore processing, testing and beneficiation. Problems as simple as ore sampling or as intricate as plant design are taken in stride by the world-famed Galigher equipment and engineering service.

Write us for any special information covering single items or the entire line. Inquire also about our ore testing service conducted in a laboratory that is fully equipped and expertly staffed to handle your metallurgical problems.

Leaders in Experience & Service

HOME OFFICE

545 West 8th South Salt Lake City, Utah P. O. Box 209

EASTERN OFFICE

921 Bergen Avenue Jersey City, New Jersey

Agents In All Principal Foreign Mining Districts

THE GALIGHER CO.

CONSULTATION . ORE TESTING PLANT DESIGN . GEOLOGIC INVESTIGATION



tant tin and tungsten producers in Por-tugal in 1953. The firm expanded both its River and Panasequeira mills during the year and developed important ore reserves below the main adit. In the Vale da Ermida section a very large tonnage of low grade tin-tungsten min-eralization was indicated. The Ritish firm of Mason & Berry Ltd.

The British firm of Mason & Berry Ltd. is reported to have gained control of the is reported to have gained control of the tungsten mining company, Sociedade das Minas do Gerez Limitada. Its tungsten concentrates were shipped under contract to the United States DMPA.

Increased production of iron ore was due to the increased scale of mining of the Monograp heavitie describe in the state of the Monograp heavities.

the Moncorvo hematite deposits in northern Portugal. Most of the ore was exported but plans were made to create a local steel industry using this ore.

Mineral and Metal Production in Portugal in Metric Tons For 1952, and 1953

Commodity	1952	1953
Antimony®	280	
Arsenopyrite	10,473	11,342
Arsenopyrite conc. with gold and silver ^q	2 025	2 444
Cassiterite-tungsten	2,825	2,611 835
Arsenopyrite-camiterite ^b	2,000	1,818
Cassiterites	2,000	1,818
Barite	621 93	316
Beryl	345	480
Chromite	108	
Iron ore	88,975	142,263
Lead	1,065	12,625
Chalcopyrite	11,019	12,023
Less than 1% Cu	580,316	491,309
More than 1% Cu	175,581	159,428
Scheelite ⁸	4,441	4,286

Preliminary figures by Servico de Fomen Mineiro. 2. 50% Sb. 3. With 198 grains gold a SOS grains silver per ton. 4. With 25% Sn. With 19.24% Sn. 6. With 65% Sn. 7. With 42. Mn. 8. With 65% WO₂.

SPAIN

Area .				è		1	19	9	5,	5	1	0	1	50	į	16	are miles
Capita	d																Madrid
Curren	C	y	L	le	ii	١			*								. Peseta
																	\$0.0237
Chief																	Mercury,

Spanish mineral production in 1953 was about the same as in 1952, despite the fact that the electric power situation

was about the same as in 1952, despite the fact that the electric power situation was not very favorable, especially at the end of the year. On the other hand, the normalization of markets, with declines in the prices of some metals, has tended to curb production.

The production of iron pyrite was 1,600,000 tons, as compared with 1,934,000 in 1952. This decrease was principally due to the slowdown of demand in the pyrite market. Nevertheless, the government's search for additional deposits continued unabated in the Province of Huelva, since most of the increase in production will be absorbed by the Aviles Iron and Steel mill, the construction of which was well advanced. In 1953, 6,214 tons of blister copper was produced (7,500 tons in 1952), largely from chalcopyrite. The production of iron ore was increased to 3,900,000 tons from 3,504,000 in 1952, output having been augmented by new operations. Of the 1953 figure, 921,000 tons were produced in Spanish Morocco.

Lead production increased considerably (53,000 tons in 1953—40.840 in

Lead production increased considerably (53,000 tons in 1953-40,840 in 1952). This resulted from increased out-

Production and Export of Swedish Mineral Products In Metric Tons in 1952 and 1953

		1952	1953				
Commodity	Production	Export	Production	Export			
Iron ore Pyrite Lead concentrate Zinc concentrate Copper concentrate Tungsten concentrate	402,000 27,400 66,600	15,700,000 10,400 12,000 81,000	17,130,000 386,291 33,954 78,583 52,679	14,553,000 12,000 8,346 76,393			
(60% WO _n)	435		440				

put of the mines and also from the re-washing and retreating of tailings. How-ever, it is feared that production will not be so high in 1954, because of first; the decline in price, and, second, the shortage of labor. The latter is due to the laborer's preference for agricultural pursuits, which are less arduous.

Zinc production increased slightly

(22,720 tons in 1953-21,200 tons 1952).

The production of tin increased from 1,113 tons in 1952 to 1,500 tons in 1953. Wolframite production of 2,485 tons was about equal to that of 1952. The mines became less active toward the end of the year due to the decline in price.

There was an increase in the production of manganese ore, production being 34,700 tons.

34,700 tons.

Almaden exported 43,000 flasks of mercury in 1953. The new metallurgical plant was finished and test runs started. Work has begun on a 400 meter shaft which will open new levels for mining. The production of aluminum amounted to 3,975 tons. The production of estees less important mineral was

of other, less important minerals was about the same as in 1952.

SWEDEN

Area 12	73,000 square miles
Capital	Stockholm
Currency Unit .	Krona
Value	\$0.1937
Chief Mineral rite, copper,	Products—Iron, py- lead, zinc.

In addition to the regular Swedish mining operations prospecting for both iron and sulfide ores continued during 1953, and sulfide ores continued during 1953, Many of the numerous indications which were obtained during the extensive geophysical surveys by air in 1952 have been examined. A number of new deposits have been found often in connection with earlier worked mines. By diamond drilling at Dannemora in Uppland the Store Kornerberge, Bergelags, Commond drilling at Dannemora in Uppland
the Stora Kopparbergs Bergslags Company has confirmed the existence of a
parallel iron ore deposit. The Ställberg
concern has struck new iron ore bodies
at the Klara mines in Närke.

At the Strömhag mine in Vattholma,
Uppland, the Ställberg concern has
started the mining of iron ore containing a smaller quantity of barite in connection with existing and planned research work on the entire iron ore area

search work on the entire iron ore area surrounding this mine.

At the newly discovered iron ore de-posit, Vingesbacke, which belongs to the Swedish Ball Bearing Company (SKF), the building of a shaft house and a mod-

the building of a shaft house and a mod-ern hoisting plant has continued.

At the Idkerberget iron ore mine in the neighborhood of Ludvika, Dalecarlia, a new shaft house has been constructed for the new shaft. At Stora Kopparbergs Bergslags Company's newly completed plant at Blötberget near Ludvika, the

output has been estimated at 200,000

tons iron concentrate per year.

To replace the old concentrating plant for iron ore at the Stortäkt mine in Fa-gersta which was shut down last year, the Fagersta Steel Works have started the building of a new plant near the Rud mine in the Semla field, Fagersta. The new sink and float plant at Stri-

erg was ready for production at the end of last year.

of last year.

At the mines of LKAB at Kiruna, the development work for the underground mining is going on, as well as the erection of new surface buildings at Kiruna and Malmberget, which are necessary for the projected concentration and moderni-

the projected concentration and modernization of operations.

The Boliden Company's prospecting and construction activities at Västerbotten and Lapland have continued as usual. At the Rudtjebäcken mine a new hoisting plant has been built for copper and zinc ore mining. This ore body is Swedish state property and is mined by Boliden. About 1,500 of the 5,000-meterloog convecting tupnel at a denth of 400 long connecting tunnel at a depth of 400 meter has been driven between Boliden and the Långsele mine. New sulphide ore concentrating plants at Boliden been put in operation. The ore shall be transported by trucks to the Boliden plant from the Renström mine situated 20 kilo-

from the Renström mine situated 20 kilometers away.

The Swedish Geological Survey continues prospecting activities in Lapland and Västerbotten, where several sulphide ore indications shall be examined.

In central Sweden, preparations are being made to shut down mining operations at the Lövas Sulphide mine in Dalecarlia, and the iron and zinc ore mining at the Gräns mine near Ludvika is temporarily discontinued.

porarily discontinued.

At the Zinkgruvor Company at Garpenberg in Dalecarlia, the new plant for lead and zinc flotation has started production and hoisting has reached a daily quantity of 900 tons.

UNITED KINGDOM

Area 94,279 square miles Capital London Currency Unit . . . Pound Sterling Value \$2.80 Chief Mineral Products-Iron, tin, lead, Avorspar.

During the past year there has been very little change in the mining situation. Iron ore production has increased, along with some expansion in the lead industry,

but there has been a recession in the production of tungsten and barite. Production of iron and steel has in-creased 1,000,000 tons over the 1952 output. The country's ingot capacity has been increased 500,000 tons annually, following the inauguration of a new basic open-hearth steel plant erected by Dorman Long and Company Ltd. at Lackenby.

It is believed that iron ore production in 1953 was greater than in 1952, complete figures are not available yet.

Two mines, Geevor and South Crofty, Two mines, Geevor and South Crofty, furnished the bulk of the tin output. No figures are available for the whole year, but up to the end of October, 940 long tons of metal had been produced. Production for the full year is likely to be around 1050 tons, which is slightly higher than the 1952 tin production of 948 tons.

Geevor Tin Mines Ltd., situated near Lands End in Cornwall, mined 57,368 tons of ore in 1953 to produce 600 tons of concentrate. Average grade was 24.43 pounds of cassiterite per ton of ore. At South Crofty 44,182 tons of tin ore were milled with a recovery of 475 tons of tin concentrate, 3 tons of wolframite, and 63% tons of arsenic. The drop in tin prices has forced some curtailment among some of the smaller preducers. some of the smaller producers.

In 1951, the lead output amounted to In 1951, the lead output amounted to 6093 tons of concentrate or some 4092 tons of metal; in 1952, it fell to 3923 tons of metal, while in 1953, up to the end of November, it amounted to 3882 tons so that for a full year it seems likely that production will reach 4200 tons.

In North Wales, the old established Halkyn United Mines situated in Flintshire, mills about 150 tons of ore daily, producing both lead and zinc, although much of the company's revenue is derived from the sale of agricultural and very pure industrial limestone which is produced by underground mining.

In Wales, the Parc mine, operated by Johannesburg Consolidated Investment Ltd., continues to produce. Diamond drilling for location of new ore bodies at that property has been reported to be very successful. Another mine in the dis-trict, the Trecastell mine, has been closed recently due to the fall in lead prices.

In Derbyshire, good progress has been made in exploring an area around Mat-lock by Matlock lead mines, and a promising lode discovered at Riber Hill. promising lode discovered at Riber Hill.
The company is owned jointly by Johannesburg Consolidated Investments and Derbyshire Stone Co. and exploration by a 9 by 8 foot incline shaft has confirmed a good lode 750 feet from surface. It is hoped that if development persists a large treatment plant will be erected, and it is reported that a production of 10,000 tons of lead annually is being contemplated.

The Nentsbury mine near Alston in Cumberland, owned by Anglo-Austral Mining Company, closed down at Christmas. Some production is being made by the Weardale Lead Company, and they have reopened the Barbary mine, a lead-fluorspar producer, in Weardale. Bangrin Tin Syndicate and the Rio Tinto Com-pany Ltd. are doing some prospecting in the Leadhills district of Lanarkshire, Scotland.

No figures are available for fluorite No figures are available for fluorite, but it has been steady around 52,000 tons for the past three or four years, the production coming in the main from Oenstables Ltd. at Matlock, the Glebe mine at Eyam, and the Long Rake, all three being in Derbyshire. A few mines in the Penines, which include the Weardle Lead Co. Angle Austal, and the dale Lead Co., Anglo-Austal, and the Stanhopeburn mine owned by Fluorspar Ltd., also are producing.

Barite mining has been much restricted this year and is likely to be much below the last published figure of 58,000 tons for 1951. A number of mines such as Cow Green have closed and others are working on a much reduced scale.

WESTERN GERMANY

Area 96,600 square miles Currency Unit Deutsche Mark ... \$0.2361 Capital ... Value Chief Mineral Products-Iron, potash, lead, zinc, fluorspar.

Despite the fact that prices of non-ferrous metals were lower in 1953 than in 1952 mine output of lead and zinc (recoverable metal content) increased 22 and 9 percent respectively. Pyrite and iron ore production were somewhat lower in 1953, while potash salts output remained about the same.

Smelter output of aluminum increased about 6 percent; also the production of refined lead and copper showed advances of 9 and 13 percent respectively.

Zinc output was unchanged, while iron
and steel production could not quite

and steel production could not quite keep the post-war peak reached in 1952. Trends of mine and smelter output in Western Germany in the future are quite uncertain, since they will largely be de-termined by political developments and economic tendencies on the chief world markets.

Mine Production in Western Germany in Metric Tons For 1949, 1950, 1951, 1952, and 1953

Commodity	1949	1950	1951	1952	19531
Lead ore ²	41.321	46,900	50,700	51,700	63,300
Zinc ores. s	58,290	98,400	101,900	106,500	116,600
Copper ores	863	1,700	2,100	2,800	2,500
Pyrite	452,212	548,961	572,038	571,300	529,500
Iron ore, crude weight	9,112,000	10,883,000	12,926,000	15,413,000	14,621,000
Iron ore, iron content	2,436,000	2,939,000	3,473,000	4,102,000	3,898,900
Potash salts, crude weight	7.280,600	8,926,534	10,847,600	12,585,100	12,586,800
Potash salts, K2O content	748,800	1.095,800	1,323,300	1,553,700	1,578,500
Salt (rock and evaporated)	1,800,000	2,468,600	2,757,300	2,576,000	2,873,200
Graphite	(4)	7,238	10,304	8,411	(4)
Fluorspar	(4)	92,539	140,390	146,570	(4)
Barite	(4)	285,226	388,836	285,322	(4)
Bauxite	(4)	4.161	5,381	7,186	(4)
Columbium ore	***	414	9,760	1,470	(4)
Gypsum	(4)	355,783	468,700	587,263	(4)
Feldspar	(4)	76,702	98,231	102,909	(4)

Preliminary figures, 2. Recoverable metal content, 3. Including recoverable zinc content of Pyrite.
 Not available.

Smelter Production in Western Germany in Metric Tons For 1951, 1952, and 1953

Commodity	1951	1952	19531
Aluminum	74,132	100,474	106,940
Lead (incl. lead produced by battery manufacturers)	149,680	135,473	147,025
Copper (refined)	204,848 148,465	187,566 150,804	211,565 150,619
Tin (unalloyed)	848	1,430	1,575
Tin alloys	2,440 6,105	5,700	7,508
Pig iron	10,697,000	12,877,000 15,806,000	11,655,000

1. Preliminary figures.

YUGOSLAVIA

Area 99,208 square miles . Belgrade Chief Mineral Products—Iron, bauxite, copper, pyrite, lead, zinc, chromite.

Lead and zinc ore production in 1953 increased about 19 percent and lead metal production about 5 percent over 1952. Zinc metal production remained on the same level. The biggest lead producer is Trepca (Serbia). Zletovo (Macedonia) passed Mezica (Solvenia) in lead resolution. Supilo Stiera (Montenegro) donià) passed Mezica (Solvenia) in lead production. Suplia Stjena (Montenegro) is the fourth important producer of lead. The ancient mine, Srebrenica (Bosnia), was reopened. At Sabac (Serbia) an electrolytic zinc plant with an annual capacity of 12,000 tons of zinc and 40 tons of cadmium is nearing completion. Copper ore production increased about 6 percent, but blister copper production decreased owing to power shortage in December. The enlarged electrolytic copper plant at Bor (Serbia) treated nearly

per plant at Bor (Serbia) treated nearly

Currency Unit Dinar Value \$0.003333

all blister copper, so production of electrolytic copper increased about 30 percent. At Majdanpek (Serbia) 105,000,000tons of ore containing 0.9 percent Cu and some pyrite have been developed. Daily treatment at a rate of 10,000 tons is planned. Concentrate will be smelted at Bor. The Bor smelters are being recon-structed, reverberatory furnaces replacing water jackets. At Sevojno (Western Serbia) a rolling plant for copper and copper alloys is near completion. Annual capacity 17,000 tons. At Svetozarevo (Serbia) a cable factory has been erected which will consume 15,000 tons of copper yearly. Quartzite containing some gold was treated in a cyanization plant at Bor starting in the autumn of 1953.

THE NORTHERN BLOWER COMPANY

Mfrs. of Norblo Dust and Fume Collection Equipment 6409 Barberton Ave., Cleveland 2, Ohio



PRODUCTS: Automatic and Semi-Automatic Bag Type, H. E. L. S. Cyclone or Centrifugal Type, Hydraulic Type Dust and Fume Collectors, Cement Air Cooling System, Self-Centained or Portable Bag and Filter Type Units, Exhaust Fans . . . All designed and fabricated by our own shaps.

Norble Automatic Bag Type

For continuous or heavy duty service providing very high efficiency at very low cost of operation and maintenance. Basic unit contains 78 bags, 6" diameter, 8' 3" long. Air flow is upward, frem inside, thus keeping bags fully distended. Total free cloth area per compartment 936 square feet. Shaking and cleaning controlled by electric timer, is cyclic, one compartment at a time, each having its individual compressed oir shaker mechanism and the whole system variable and adjustable for dust load without shutting down. Any compartment can be cut out without affecting others. Access to interior is on the clean air side

Norblo Standard Bag Type

For intermittent service, as fan and unit must be shut down for cleaning, usually at noon hour and end of working day. Electrical or compressed air shaking and cleaning mechanism. Basic unit has 40 bags 6" diameter, 8' 3" long, 480 square

feet cloth area. In both Standard and Automatic bag types made by Norble, extra large hoppers provide air expansion space resulting in great drop in air velocity and a maximum degree of dust separation by gravity before passing upward for final filtering.



Norblo Hydraulic

A high efficiency, wet type collector, for separation of dust mixed with smake or fumes. In most installations the Hydraulic unit is used with a Norbio Cyclene collector, thus reducing the amount of wet sludge to be handled. There are no moving parts. Filter beds are coke or high-fired ceramic tubes, light in weight and kept in motion by ascending air stream so that beds are self-cleaning. Built in 11 standard sizes with capacities up to 26,000 cfm.

Norbio H.E.L.S. Centrifugal

A cyclene or centrifugal type collector for ail materials, from saw-dust to fly ash; characterized by high efficiency of collection with low static drop. The Norblo H. E. L. S. has no internal vanus, gadgets or dampers. High efficiency is obtained by scientific proportioning and by the patented (No. 2,259,919) expanding nozzle. These design features eliminate the powerwasting back eddy. Built in standard sizes with capacity up to 37 500 cfm



Norble Portable Units

Self-contained units for efficient, de-centralized dust collection. Convenient, space-seving; can be located close to the dust source. Made in six sizes in bag type; three sizes in filter type, with capacities from 300 to 1350 cfm.
All models have 8" static at fan. Fans exeptionally quiet.



Norble Exhaust Fans

These high speed, low power fans have been developed especially for dust collecting systems and by proper wheel selection are adaptable to all types of materials handling. All wheels are statically and dynamically balanced. Heavy duty bearings are standard equipment



Antimony ore production decreased, but metal production increased about 6 percent. At Brassina (Western Serbia) a new concentrator (gravity and flotation) started operation in September 1953. A new aerial tramway connects Brasina with

new aerial tramway connects Brasina with the Zajaca smelters. At Split (Dalmatia) a pilot plant was erected to treat antimony concentrates by a hydro-metallurgical (amalgam) process.

Mercury production at Idria (Slovenia) remained at the 500 ton per year level, set for several years. Bauxite production decreased for about 20 percent. As competition from Greece was felt on the ore market. At Kidricevo (Strnisce) (Slovenia) a new plant with an annual capacity of 45,000 tons of alumina and 30,000 tons of aluminum was nearly completed. Alumina production is expected to start tons or autinium was nearly completed.
Alumina production is expected to start in the spring of 1954 and aluminum in the autumn. The completion of power plants which were under construction de-

layed the starting of the Kidricevo plant.
Chromite production increased about 18 percent. West of Skopje, (Macedonia) big new factories for treatment of chrobig new factories for treatment of chro-mite are under construction. Sodium-bichromate (5,000 tons per year) and ferro-alloys will also be produced there. At Rankovicevo (Serbia) the new factory "Magnochrom" started operations early in 1953, producing refractories of very good quality.

Tungsten ore was mined near Majdan-pek and Bor (Serbia). Gravity concentra-tion and flotation is done at Blagojev Kamen.

Iron ore production increased about 17 percent preparing a stock pile for the new 600 ton blast furnace at Zenica (Bosnia) which was completed. Pig iron production from Jesenice (Slovenia), Sisak (Croatia) and Vares. (Bosnia) remained on the same level as 1952, but steel production increased about 17 per-

Power shortage during November and December caused by delays in completion of power plants under construction and by a severe winter drought was the reason for a serious cut-back of copper, lead, aluminum, and zinc production in December. The power shortage continued during January and February 1954.

Metric Tons of Ore Mined in Yugo-slavia in 1939, 1951, 1952, and 1953

Ore	1939	1951	1952	1953
Lead-zinc Copper Antimony Bauxite Chromite	774,772 983,903 18,963 718,594 44,852		1,203,764 1,264,998 74,594 577,196 107,222	

Metric Tons of Metal Produced in Yugoslavia in 1939, 1951, 1952, and 1953

Metal	1939	1951	1952	1953
Refined lead Zinc	10,651 4,918	60,068 13,223	67,180 14,463	70,796
Blister copper Electrolytic copper	41,643 12,463	32,011	32,819	27,764
Antimony Mercury	1,500	1,229	1,329 504	1,410
Aluminum Bismuth	1,705	2,828 88	2,563	2,795
Silver	72	94	80	95

Metric Tons of Iron Ore Mined, Pig Iron and Steel Produced in Yugoslavia in 1939, 1951, 1952, and 1953

Commodity	1939	1951	1952	1953
Iron ore	663,813	581,352	676,010	794,917
Pig iron	101,000	248,000	272,884	269,748
Steel	235,000	434,000	442,354	514,537

Hustlin' Production at Hibbing





SHOVIN' A SHOVEL. Valuable stripping time is gained as the TD-24 pushes a power shovel upgrade to a new digging location, just one of the many jobs handled daily by the Big Red INTERNATIONAL.

ON TRACKS ...ON RUBBER

See INTERNATIONAL'S "Job-Phased" equipment

INTERNATIONAL TD-24 pays off big in Mesabi iron mining operation

Up in the Mesabi Range, S. T. Chanak & Sons of Hibbing, Minnesota, have found their Big Red INTERNATIONAL TD-24 crawler just what they need for road building, cleanup work, moving the big shovels, and working the spoil piles.

George Chanak lays it on the line: "No other crawler but the TD-24 could keep us on schedule. There are so many times in this mining business when you need the strongest crawler you can get to move haul trucks up a slippery grade or push them out of deep mud in the bottom of the mines during the wet seasons. And the big shovels are always needing help to get around in the pits.

"If that was all the TD-24 did, it would be worth its cost in the time it saves. But its real work comes when it pushes those heavy rocks away for new roads and when it is up on the spoil piles doing the work of two other tractors. We just plain couldn't do without a TD-24!"

See for yourself. Call your INTERNATIONAL Industrial Distributor for a demonstration whenever and wherever you wish. You'll get proof that INTERNATIONAL power is "power that pays!"

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS



POWER THAT PAYS

INTERNATIONAL

*Phased Equipment — Machines designed and built to handle each major phase of earthmoving most efficiently and economically.

AFRICA

ALGERIA

Area 847,818 square miles Currency Unit . . . Algerian Franc \$0.0022 Alger Value Chief Mineral Products-Iron, phosphate, lead, zinc, antimony.

The Algerian iron ores (hematite and limonite) have a 50 percent iron grade. Twelve mines were active in 1953, pro-Twelve mines were active in 1953, producing 3,300,000 tons of ore (3,102,800 in 1952). These mines are widely dispersed geographically. The one farthest from the coast (190 kilometers), that of the Societe de l'Ouenza is also the most important. This mine produced 2,470,000 tons and exported 2,412,000 tons.

important. This mine produced 2,470,-000 tons and exported 2,412,000 tons. In 1953, this company completed a very important project which was started in 1948, the re-equipping and mechanization of its mines and storage and loading facilities. The total cost was nearly 4,-000,000,000 francs. The Societe Moktael-Hadid produced 252,700 tons and exported 217,800 tons.

The two phosphate mining companies, Cie. des Phosphates de Phosphates de Constantine and Cie. Miniere du M'Zaita, produced 528,000 tons in 1953 (690,000 tons in 1952). Examples of production in the past years are: 1926–929,000 tons, 1929–747,000 tons, and 1947–706,000 tons. The Algerian phosphates, which do not contain more than 63 to 65 percent, PsOs are more and more handicapped by competition with richer ores from America and Morocco. The importance of this crisis is such that at the end of the year the Cie. Miniere du M'Zaita suspended its operations temporarily.

The importante in the past years are: temporarily.

temporarily.

The improvement noted in lead and zinc ore output was due to work in Algeria on the extension of the Moroccan Bou-Beker deposit. This work has been carried out by the Societe Algerienne du Zinc and financed, in part, by United States capital. Of a total of 11,000 tons of lead concentrate produced in Algeria in 1953 (6,300 in 1952), and of 32,000 tons of zinc concentrate (23,200 in 1952), the Societe Algerienne du Zinc produced 4,000 tons of 75 percent lead concentrate and 20,000 tons of 60 percent zinc concentrate. By the end of percent zinc concentrate. By the end of 1954, this company hopes to achieve a daily production of 1,000 tons with a mill head of 8 percent zinc and 2 percent lead, zinc, animony.

cent lead. The Societe Miniere du
Djebel Felten has put a flotation mill
in operation which is capable of treating
120 tons per day of lead-zinc sulphide
ore with a combined metal content of 12
percent. The French government, in
addition, has agreed to a contract calling
for a loan of 258,000,000 francs by the
Defense Materials Procurement Agency
to the Societe des Mines de Sidi Kamber
for the purpose of developing the com-

for the purpose of developing the com-pany's lead mine.

However, certain less-favored mines were forced to suspend their operations, e.g. the Societe des Mines du Djebel Gustar and the Societe des Mines de Zinc du Guerour.

Antimony ore is produced by the Societe des Mines d'Ain Kerma, which notciete des Mines d'Ain Kerma, which not-withstanding the price drop, has in-creased its production from 4,460 tons in 1952 to 6,400 tons in 1953. The pro-duction of the following ores has been noticeably stable: iron pyrite (27,000 tons in 1953–24,000 in 1952); chalco-pyrite ore 160 tons in 1953–190 tons in 1952); and scheelite (60 tons in 1953 –72 tons in 1952)

72 tons in 1952).

While the production of diatomite increased from 19,700 tons in 1952 to 28,900 tons in 1953, that of barite and smectique clay remained about the same: barite-13,000 tons in 1953, 11,-

same: barite—13,000 tons in 1953, 11,-700 in 1952; smectique clay (montmo-rillonite and attapulgite)—70,200 tons in 1953, 76,000 tons in 1952.

Prospecting in the Saharan territories of Southern Algeria has been actively pushed by the Bureau de Recherches Minieres de l'Algerie (BRMA). The Minieres de l'Algerie (BRMA). The investigations made between Colomb-Bechar in the east and Tindouf in the west have led to the measuring of the deposits and indications of iron, manganese, copper, lead, zinc, and potassium. Within the environs of Tindouf, 80,000,000 tons of semi-phosphorous iron ore have been found with an iron content of 54 to 55 percent. The probable total of reserves is estimated at several hundred million tons.

BELGIAN CONGO

Area 905,516 square miles Capital Leopoldville gold, manganese.

The production of nearly all the min-erals mined in the Belgian Congo in-creased during 1953 with underground and open pit mines operating at full ca-

pacity. In 1953 the Union Miniére du Haut Katanga, largest mining company in the Belgian Congo, produced 212,500 metric Belgian Congo, produced 212,500 metric tons of copper compared with 205,750 tons in 1952. Its production of cobalt increased approximately 20 percent over that of the previous year. Output of this company's zinc concentrate was also increased; most of which went to Belgian zinc works for refining, some was delivered to the Kolwezi refinery of Société Métallurgizue du Katanga. Union Minière's production of uranium, radium and precious metals showed no change from

Currency Unit Belgian Franc Value . Chief Mineral Products-Uranium, copper, cobalt, tin, diamonds, zinc,

> that of 1952. This company is the largest uranium and cobalt producer in the world.
>
> During the year Union Minière did important research in the treatment of sulphide cuprocobaltiferous ores with suc-cessful results. A pilot plant for treating these ores is now under construction.

> Société Métallurgizue du Katanga put

Société Métallurgizue du Katanga put its Kolwezi electrolytic zinc refinery into operation towards the middle of 1953. The refinery has an annual capacity for producing 36,000 metric tons.

Tin producers in the Belgian Congo did not lower their output during 1953 despite the sharp decline in the world price of tin. Producers still benefited during the year from their contracts with the Reconstruction Finance Corporation which enabled them to sell a large part of

their output at \$1.2075 per pound. This allowed them to sell their production at a price higher than the average market

Metal and Mineral Exports from Belgian Congo and Ruanda-Urundi in Kilograms During 1952 and 1953

Commodity	1952	1953
Silver	5,349	1,099
Cobalt, granules 94% Copper-cobalt,	3,374,032	4,649,897
white alloy	8,234,010	8,793,960
Copper Wire bars 99%	09 724 004	04.044.407
Ingot hars 99%	98,724,006 16,198,690	94,044,407
U.M.P.L.P. 97%	89.864.871	9,395,214
Wire	20,259	474
Tin metal	2,860,333	2,903,729
Tin concentrate	16,029,743	20,412,612
Maganese ores	125,092,173	183,707,233
Columbium concentrate		337,149
Tantalum concentrate	37,544	26,150
Tungsten concentrate Zinc	854,471	1,023,258
Crude concentrate	92,186,065	93,961,980
Roasted concentrate	46,842,220	31,397,100
Miscellaneous		194,481
Zinc metal	29,630	5,831,081
Gold	12,433	12,733
Cadmium	19,550	31,935

No returns are released on production or exports uranium and radium.

FRENCH MOROCCO

Area 200,000 square miles
Capital Marrakech
Currency Unit France
Value \$0.025
Chief Mineral Products—Manga- nese, cobalt, phosphate, lead

Moroccan mining activity up to 1952 underwent a brilliant period of development, both in prospecting and in production. The world-wide decline in demand and the price drop which resulted in 1953 caused a slackening in both.

The minerals which continued a production increase were virtue concentrate.

The minerals which continued a production increase were: zinc concentrate (64,000 tons in 1953—51,400 tons in 1952); copper concentrate (4,000 tons in 1953—2,950 in 1952); phosphate (4,150,000 tons in 1953—3,953,000 tons in 1952); and manganese ore (442,600 tons in 1953, of which 387,900 were metallurgical grade and 54,700 chemical grade compared with 428,300 in 1952, of which 382,000 were metallurgical and 45,500 chemical). 45,500 chemical).

Among the minerals whose production remained stationary are: iron pyrite (of which 2,000 tons are produced per year); asbestos (from 500 to 600 tons per year); and tungsten (about 20 tons per

other hand, there On the other hand, there was a marked decline in the production of lead concentrate (109,700 tons in 1953–115,270 in 1952) and lead bullion (27,400 tons in 1953–28,200 tons in 1952). The decline was more severe for cobalt concentrate (6,250 tons in 1953–9,140 tons in 1953) iron care (530,000 tons in 1953–9,140 concentrate (6,250 tons in 1953–9,140 in 1952), iron ore (530,000 tons in 1953–650,500 in 1952), Fluorspar (2,200 tons in 1953–3,300 tons in 1952), smectique clay (4,220 tons in 1953–5,500 in 1952), and beryl (30 tons in 1953–130 tons in 1952). Mining of two minerals almost ceased. They are: antimony ore (100 tons in 1953–1,490 in 1952) and barite (50 tons in 1953–3,100 in 1952).

1952) and barite (50 tons in 1953—3,100 in 1952).

The rich Moroccan phosphate mines have succeeded in maintaining their output (4,150,000 tons in 1953—3,953,-

000 in 1952-4,716,800 in 1951-and

3,872,000 in 1950).

Manganese ore came from 52 mines of which the most important are: the of which the most important are: the Societe des Mines de Bou Arfa (68,500 tons), the Societe Cherifienne d'Etudes Minieres (Imini) (240,000 tons), and the Cie. Tifnout-Tiranimine (Tiouine) (79,000 tons). The majority of the mines (Bou Arfa excepted) are located to the south of the High Atlas Mountains, in the high Souss valley, the Djebel Sarho and the Siroua. The ore has to be transported over the High At-Djebel Sarho and the Siroua. The ore has to be transported over the High Atlas to reach its shipping port—Casablanca. The inauguration in November of 1953 of an aerial tramway crossing the Tichka Pass has made the use of trucks on the most dangerous parts of the road no longer necessary. The increase in production of zinc came as the result of an extension of the workings of the Bou Beker deposit. Lead from the same deposit is treated at the L'Oued El Heimer smelter, which in 1953 produced 27,400 tons of lead bullion and 29,300 kilograms of silver in ingot and granular form. granular form.

At the end of 1953, only three antimony mines were in operation, on a very reduced scale, as compared with 18 mines in a normal period.

Ait Amar, the principal iron ore mine now in operation, is operated by the Societe Marocaine de Mines et Produits

Societe Marocaine de Mines et Produits
Chimiques. This mine produced 423,000
tons in 1953, and 552,470 in 1952.
The "Touit" gold mine of the Cie.
Miniere du Djebel Mansour in the
Djebel Sarho, produced 79 kilograms of
gold (126 in 1952). On the other hand,
some hundreds of kilograms of gold are
recovered each year from the cobalt ores
of Bou Azzer, which contain 15 to 20
grams of gold per ton.

A French metropolitan company, the
Cie Miniere des Montmins, has concluded an agreement with the Bureau
de Recherches e de Participations Minieres du Maroc (BRPM) for mining the
Hassiane ed Diab wolframite deposit.
Fourteen tons had been taken out by
the end of 1953.

GOLD COAST

Area	96,	000 square mil	es
Capital		Acc	ra
Currency U	Jnit	Pound Sterlin	ng
Value		\$2.0	80
		Products-Gol	
mangai	nese, dio	monds, bauxit	e.

The British Aluminum Company, Ltd. increased output of bauxite from its Kanayeribo bauxite mines in the Awaso district in 1953. The £3,500,000 spent on the recent extensions to the Takoradi harbor enabled the additional tonnage to be exported without difficulty. British Aluminium was gone ahead with its am-bitious development scheme for still greater production from this area. Fraser & Chalmers is supplying new plant and equipment and British Ropeway Engi-neering Co., Ltd. the haulage gear. The installations are not yet completed but it is anticipated that they will be in operation in 1954.

ation in 1954.

For the third year in succession African Manganese Co., Ltd. produced more than 800,000 tons of manganese. Apart from the small mine at Hotopawhich averaged about 1,000 tons a month-the whole of this output came from Nsuta. Additional earth moving

FRENCH EQUATORIAL **AFRICA**

(A Federation of the following territories: Gabon, Middle Congo, Ubangi-Shari and Chad)

Area 912,049 square miles Capital Brazzaville Currency Unit Franc

The minerals produced in French Equatorial Africa are gold, diamonds, lead, zinc, and columbo-tantalite. Among those with future possibilities are man-

ganese, copper, phosphate, and potash.

The continuing low price of gold has led a certain number of producers to close down completely, the most important being the Cie. Miniere de l'Oubanghi Oriental at the end of 1953. The only companies which maintained their only companies which maintained their production were those with high-grade deposits. The working of new deposits has permitted a slow production increase from 1,600 kilograms in 1952 to 1,750 in 1953. The maximum annual production in the past was 2,980 in 1941.

tion in the past was 2,980 in 1941.

Vast areas have been searched, and as a result some new and important alluvial diamond deposits have been found. As with gold, the big problem is having to use hand labor, since mechanization is impossible, first because of the great number of small deposits, and second because equipment has to be carried to the deposits overland and through forests, often without even trails. The prospecting and equipment of the two companies, Cie. Miniere de l'Oubanghi Oriental and Societe de Recherches et d'Exploitation Diamantiferes, have been financed, in large part, by ECA and DMPA. Production declined slightly in 1953 (137,000 carats) from 1952 (157,-1953 (137,000 carats) from 1952 (157,-0003

O00).

The Cie, Miniere du Congo Francais produced 8,000 tons of lead ore. The company has reorganized its washing plant at its M'Fouati mine and intends to start working the Hapilo deposit 5 kilometers from M'Fouati.

Value \$0.025 Chief Mineral Products-Diamonds, gold, lead, zinc.

It is expected that work will be started on four copper, lead, and zinc deposits in the Mindouli area. Studies have been made by the Cie. Miniere du Congo Francais, and two French-American companies, Societe d'Exploitation Miniere au Congo and Societe Miniere du Niari (SOMNIA).

Some tons of columbite-tantalite are exported annually from the Mayoko (Middle Congo) gold deposit, where it is a byproduct.

is a byproduct.

The Gabon manganese ore, known since 1938, has been the object of systematic study since 1952 by the Bureau Minier de la France d'Outre Mer (BU-MIFOM). The richest part of the deposit is located on the left bank of the Ogooue River, 50 kilometers in a straight line northwest of Franceville. Initial work has confirmed the existence of 50,000,000 to 75,000,000 tons of ore with a grade from 48 to 50 percent manganese after sorting (psilomelane, polianite, pyrolusite). The Cie Miniere de L'Ogooue (COMILOG) has been formed to finish the studies and eventually mine the deposit. The company has ally mine the deposit. The company has as its principal members the Bureau Minier de la France d'Outre Mer, United Steel Steel Corporation, and the Cie. Miniere de l'Oubanghi Oriental.

Studies are being carried out in the Studies are being carried out in the Holle region on a phosphate deposit which has been known for some years. The drilling in Gabon by the Societe des Petroles de L'A.E.F. has revealed important deposits of potash which may be very interesting if they are of high enough grade.



FIRST HMS PLANT in Southern Rhodesia was started in 1953 by Rhodesian Chrome Mines Ltd. near Selukwe. The plant produces a coarse highgrade metallurgical chrome concentrate.

Gold Coast Mineral Exports and Value in 1951, 1952, and 19531

Commodity		1951		1952	1953			
	Quantity	LValue	Quantity	£Value	Quantity	£Value		
Bauxite ⁰ Manganese ² Gold ³ Diamonds ⁴	141,000 832,000 698,676 1,632,000	£247,000 7,416,000 8,564,000 5,703,000	74,368 794,192 711,096 2,051,496	£137,581 8,332,847 9,178,889 5,547,026	110,000 679,000 667,000 1,998,000	£192,000 7,959,000 8,582,000 3,378,000		

1. First 11 months. 2. Metric tons. 3. Troy ounces. 4. Metric carats,

equipment (Ruston-Bucyrus) and rolling stock (Railway Mine & Plantation Equipment Ltd.) were delivered and 2,490,000 tons of earth and rock were handled during 1953. Half of this was overburden and half was put through the washing plant to produce a concen trate with a manganese content of 48 percent. Measured in these terms the Gold Coast output amounts to over one-quarter of the world's total.

During 1953 the gold mining industry in the Gold Coast benefitted from the

improved cooperation between Africans and Europeans, and more settled conditions were experienced as a result of the wage settlement which was negotiated in 1952 and provided pay increases of about 20 percent.

As the mines were authorized to sell

the whole of their production on the Free Market gold output for 1953 shows an increase over the very satisfactory

1952 production.

Gold Coast production of diamonds, begun some 34 years ago, reached a total of some 22,000,000 carats. The largest producer in the Colony is Con-solidated African Selection Trust Ltd. solidated African Selection Trust Ltd. Caratage production was about the same as in the previous year but, as a far greater yardage had to be treated costs were considerably higher. However, the price obtaind for the diamonds showed an improvement so that the net profit was higher than the previous year. Prospecting and development proceeded normally but the expansion of operations was sharply jeopardized by the tax position.

FRENCH WEST AFRICA

(A Federation of the following territories: Mauritania, Senegal, French Sudan, Niger, French Guinea, Ivory Coast, Dahomey, and Upper Volta)

Area 1,814,810 square miles Capital Dakar Currency Unit Franc

A few years ago French West Africa exported only gold, ilmenite, and dia-

Chief Mineral Products-Bauxite,

monds. Now, there has been added iron ore, bauxite, lime phosphate, aluminum

iron, phosphate.

phosphate, and tin. Soon copper ore will be produced.

The Conakry deposit in French Guinea is one of the world's three great iron ore deposits with reserves which are iron ore deposits with reserves which are measured in billions of tons. Operated by the Cie. Miniere de Conakry, this mine in 1953 yielded (and exported) 500,000 tons of ore with a content of 51.5 percent Fe, 9.8 percent Al-Os, 2.5 percent S₁O₈, 1.25 percent Cr, and 0.06 percent P. Mining is by open pitting.

Near Fort Gouraud in Mauritania, the north side of a hill called the Kediat d'Idjill is made up of quartzite, in the heart of which are massive lenses of pure hematite, to form an ore of high quality assaying 65 to 68 percent Fe. The Societe des Mines de Fer de Mau-ritanie (MIFERMA) has been formed to study the deposit, and eventually mine it. The proved reserves h reached 100,000,000 tons.

reached 100,000,000 tons.

The bauxite deposits on the Los Islands, opposite Conakry, French Guinea, are being worked by the Societe des Bauxites du Midi, which produced and exported 363,000 tons in 1953, as compared with 99,000 tons in 1952. A bauxite deposit has recently been discovered in French Guinea, 15 kilometers southwest of Kindia, which has estimated reserves of 1,000,000,000 tons. The Societe Africaine de Recherches et d'Etudes pour l'Aluminium (SAREPA) has been formed to set up a mining program. This is dependent on the Electricite de France's pursuing its hydroelectric studies aimed at creating an important de France's pursuing its hydroelectric studies aimed at creating an important source of energy on the nearby Konkoure River. The ultimate idea is to build an electrochemical aluminum plant with an annual capacity of 100,000 tons of metal.

The copper deposit at Akjoujt, Mauritania, has been systematically explored. A 200,000 ton metal reserve has already been proven. Prospecting is being done by the Societe des Mines de Cuivre de Mauritanie (SOCUMA), which was founded in July, 1953.

On the outskirts of Thies, Senegal, Pechiney is mining lime phosphate (70,000 tons in 1953) and aluminum phosphate (46,000 tons in 1953). In Senegal, the Societe d'Etudes et de Recherches Minieres du Senegal (SERMIS) is considering the mining of a lime phosphate deposit estimated to contain 30,000,000 tons.

The Societe Miniere du Dahomey-Niger (SOMIDANI) is working the mixed elluvial-alluvial deposits of cassitmixed elluvial-alluvial deposits of cassiferite and wolframite in the mountainous Massif de l'Air, about 100 kilometers northeast of Agades (Niger). In 1953, 150 tons of concentrate were taken out. The mining and concentration of the titaniferous and zirconiferous sands of the Atlantic Coast beaches of Senegal,

the Atlantic Coast beaches of Senegal, in the Rufisque region, has produced 5,000 tons of ilmenite and 1,000 tons of zircon. An electro-magnetic separation plant was being constructed at the end of 1953. This will permit a more thorough separation of the recovered sands. The manganese deposit at Tiere (to the north of Hounde, Upper Volta, was studied by the Societe Miniere du Niger Francaise (SMNF), in which United States Steel Corporation has an interest. The diamonds of French West Africa are produced by two companies, SO-

are produced by two companies, SO-GUINEX in French Guinea, and SA-REMCI in Ivory Coast. Important pros-pecting work is being done in the Ivory Coast by two com MINE and SORMAC companies, SANDRA-



5 Ton High Type MONITOR

Height — 42" to 48" depending on bettery capacity required. Also available in sizes 4 to 12-tons. Track gauge — 16" to 56/2".

GREENSBURG STORAGE BATTERY LOCOMOTIV

Greensburg Storage Battery Locomotives are custom-built for the job each designed to meet your specific requirements. Built in single or double motor drives with drum or contactor type controllers. Dynamic braking also available. Because of advanced engineering design, Greensburg locomotives have proven themselves up to 20% more efficient and have given longer battery life than any other storage battery locomotive of equal weight and battery capacity. On job after job, you'll find Greensburg locomotives will haul more and cost less to

Write today for details!

GREENSBURG MACHINE CO. GREENSBURG, PA



ELECTRIC CAP LAMP -M.S.A. TYPE K HAT



Today's modern mining methods call for more and better illumination. You'll find a dependable and profitable answer in the Edison R-4 Lamp. Its brilliant, unfailing beam permits miners to operate modern equipment at its greatest capacity, safely.

The famous Type K Skullgard is strong, light, durable, comfortable. Unaffected by oil, water, perspiration. Provides maximum head protection. Write for details.

M.S.A. HOISTPHONE

Dependable voice communication between hoisting engineer and moving cage, or at any level. Ideal for load leveling, shaft repairs, inspections. Also available—the M.S.A. MinePhone for instantaneous communication of orders to moving locomotives for improved haulage.



M.S.A. SELF-RESCUER

For immediate breathing protection in emergencies. Vital to the miner while traveling through carbon monoxide to fresh air. Available in cache assemblies for storage throughout the mine, or in individual carrying cases. U. S. Bureau of Mines Approved.



M.S.A. CHEMOX®

Provides complete breathing protection in any atmosphere for a minimum of 45 minutes. Chemox generates its own oxygen from replaceable chemical canister. Weighs only 13½ lbs. Comfortable in service. U. S. Bureau of Mines Approved.



M.S.A. McCAA TWO-HOUR OXYGEN BREATHING APPARATUS

Assures complete breathing protection in unbreathable atmospheres for a minimum of two hours. U. S. Bureau of Mines Approved.



M.S.A. DUSTFOE #55 RESPIRATOR

Light weight, compact, comfortable. A dust respirator that provides maximum protection. U. S. Bureau of Mines Approved.



M.S.A. "ALL-SERVICE"® MASK

Dependable breathing protection against smoke and toxic gases including carbon monoxide singly or in combination, where there is no oxygen deficiency. Unit is U. S. Bureau of Mines Approved.



M.S.A. PNEOLATOR

Automatic artificial respiration device that assures maximum chances of recovery to those overcome by poisonous gases, electrical shock or other causes of asphyxia. Pneolator is accepted by the American Medical Association.



M.S.A. MIDGET IMPINGER

A portable instrument for quick and dependable dust sampling. Entirely self-contained and hand operated. Ideal for dust control and survey work.

OTHER M.S.A. PRODUCTS FOR THE MINING INDUSTRY

Belts—Goggles—Safety Clothing—Carbon Monoxide Tester—Methane Detectors and Recorders—Stretcher Outfits—First Aid Kits and Materials. Send for our Mining Catalog for complete details On all products.



When you have a safety problem, M.S.A. is at you service. Our job is to help you.

MINE SAFETY APPLIANCES COMPANY

201 North Braddock Avenue, Pittsburgh 8, Pa.
At Your Services 77 Branch Offices in the
United States and Mexico

MINE SAFETY APPLIANCES CO. OF CANADA, LTD.

Toronto, Montreal, Calgary, Edmonton, Winnipeg, Vancouver, New Glasgow, N.S.

[World Mining Section-71]

KENYA

Area 224,960 square miles	Currency Unit Pound
Capital Nairobi	Value \$2.80
Chief Mineral Products—Soda ash,	gold, kyanite.

The Magadi Soda Company continues to be the most important single producer of minerals in the country.

The Macalder-Nyanza Mines operated by the Colonial Development Corporation Ltd., the capital of which is supplied by the British government, ceased production from its pilot plant, and the export of copper, zinc concentrates. The intention is to resume production with a full scale plant at a later date when concentrates can be shipped to Jinja in Uganda for smellting. It is intended to smelt concentrates jointly with those from the Kilembe Mine in West Uganda using power from the Jinja dam which is to be opened by Her Majesty the Queen in April 1954. April 1954

Messrs. Kenya Kyanite Ltd., and E.A. Minerals Ltd. continued to produce Kya-nite and in the former case calcined kyanite in the form of mullite.

Prospecting activity for new minerals

was severely hampered by the continued activity of the Mau Mau terrorist gangs of the Kikuyu tribe. This has meant that

of the Kikuyu tribe. This has meant that a considerable proportion of the Colony's manpower has been absorbed in anti-terrorist activity and also some areas have become unsafe for prospecting.

The only new mineral discovery of importance has been at Mrima Hill near the coast just North of the Tanganyika border. A carbonatite pipe has been located here similar to that at Sukulu in Uganda which has been under investigation for some years. The Mrima Hill deposit has been shown to contain appreciable quantities of pyrochlore, a columbate of the cerium minerals and a commercial source of columbium. The deposits are at present being investigated by the Government Mining and Geological Department, and it is believed that metallurgical assistance was being sought from the U.S. Bureau of Mines. from the U.S. Bureau of Mines

Mineral Production in Kenya and Value in Pounds, 1952 and 1953

		1952	19531				
Commodity	Quantity	Value	Quantity	Value			
Concentrates, mixed copper & zinc ^g Diatomite ^g Gold bullion ⁶ Gypsum ^g	2,400 5,932 14,800 1,593	£60,000 63,670 134,500 3,584	4,328 8,050	£60,000 100,000			
Kyanite (raw) ² Kyanite (calcined) ² Salt ² Soda ash ²	500 7,475 14,835 118,371	7,475 186,875 14,835 124,615		129,992 142,918 790,732			

2. Metric Tons. 3. Estimated.

4. Fine ounces.



PUMPING JOBS NOBODY ELSE WANTS

You can buy lots of good pumps for ordinary pumping jobs, but NAGLE PUMPS are built to survive in those applications where ordinary pumps fail.

If you must pump highly abrasive mixtures, corrosive liquids, hot solutions or heavy slurries, then you will save by using NAGLE CEN-TRIFUGAL PUMPS. Engineered to your specific requirements-The right design, the right materials of construction. Horizontal and vertical shaft types in complete range of sizes. Send for Catalog 5206.



 Modified type "SW-O" vertical shaft pump built by Nagle for severe service in an atomic energy plant.



NAGLE PUMPS, INC. 1250 CENTER AVE., CHICAGO HEIGHTS, ILL.





PUMPS FOR

ABRASIVE

AND

CORROSIVE

[World Mining Section-72]

LIBERIA

Area	43,000 sque	re miles
Capital	A	Monrovia
Currency Unit		. Dollar
Value		\$1.00
Chief Mineral	Products-In	on gold

Chief Mineral Products—Iron, gold.
Liberia's principal mineral product is iron. In 1953, 1,295,460 long tons were produced as compared with 935,161 tons in 1952. Over 60 percent of 1953 ore production, assaying plus-67-percent Fe, was shipped to the United States. Cermany, England and the Netherlands received the remainder.

The aerial survey of Liberia which was being executed under contract by the Aero Service Corporation of Philadelphia was 87 percent completed by May 1953. The Bureau of Mines & Geology of the Treasury Department continues to exercise supervisory functions until the remaining 13 percent is completed by the Liberian Cartographic Service. Mosaics, photo-indexes, and line tracings are being prepared.

ing prepared.

The latter half of 1953 marked the commencement of diamond production. Industrial and gem stones amounting to 3,243,420 carats were exported. Accurate

3,243,420 carats were exported. Accurate production figures for gold are not yet available but the indications are that there will be little change in production. During last year the Bureau of Mines technical staff was implemented by several geologists thus making it possible to accelerate exploration of known mineral descriptions of the production of deposits and increase prospecting in gen-eral. Among the minerals which show promising indications are bauxite, manand columbite.

ganese and columbite.

Preliminary negotiations have been entered into by Government of Liberia and several private companies to mine iron ore and manganese in the Eastern Province of Liberia. Work is supposed to commence on these deposits as soon as final arrangements are concluded by the companies concerned. panies concerned.

MADAGASCAR

Area	22	28	3,7	0	7	q	y cı	re	miles
Capital						 1	ľa	na	narive
Currency Ur	iit								Franc
Value						 		\$0	0.0058
Chief Miner									phite,

In general, 1953 was not a good min-In general, 1953 was not a good min-ing year in Madagascar. The production of graphite had increased noticeably since 1950, attaining 18,400 tons in 1951 and 1952, but in 1953, it dropped to 13,500 floor, but in 1953, the tropped to 13,500 tons. Most of this tonnage is made up of flake graphite; a small amount is in powder form. Similarly, the production of phlogopite mica increased from 510 tons in 1948 and 959 tons in 1949 to 1,070 tons in 1952, but in 1953, it fell to 800 tons.

Among other mineral products of Madagascar, were beryl (240 tons in 1953, 397 tons in 1952), industrial garnets (14 tons in 1953, 472 tons in 1952), and piezoelectric and ornamental quartz (18 tons in 1953, 41 tons in 1952).

The Bureau Minier de la France d'Outre Mer is continuing its investigation of copper at Vohibory, to the north of Saka, and lead at Besakay near Tsaranana. The Societe des Minerais Rares de Madagascar (SOMIRAMAD) was founded at the end of 1952 for studies and mining of beryl.

NIGERIA

Area .				3	7	2	,6	7	4	1	sc	Į	a	re	1	nil	les
Capita	1 .														L	ag	105
Curren	су	U	ni	t.	0				P	0	U	n	d	S	te	rli	ng
Value															5	2.	80
Chief	M	ine															

Nigeria is still far ahead as the world's largest producer of columbite although tin remains its main mineral product. Production figures for 1953 showed advances in both items with columbite up by 50 percent over 1952.

Prospecting for both columbite and tin was energetically carried on throughout the year using Banka and power drills and more than 20,000 test holes were drilled. The London Tin Corporation Limited, which acts as technical manager for the Amalgamated Tin Mines of Nigeria Ltd., reported that prospecting was carried on throughout the territory (56,162 acres) covered by its 588 mining leases as well as over the 23 square miles covered by its 27 exclusive prospecting licenses. On the mining leases 18,126 holes were drilled for a total footage of 302,141, and on exclusive prospecting license areas 1,945 were drilled for a total footage of 48,839.

It is anticipated that 1954 will show another important increase in the production of columbite as the operating companies have been able to map out more clearly the areas where columbite occurs with the tin (cassiterite) and are recovering, in the normal process of mining, an increased quantity in addition to that recovered from the dumps.

A geological survey has shown that there are considerable quantities of columbite in the biotite granite underlying some of the areas worked by Keffi Tin Company Ltd., and it has been decided that the mining and recovery of this columbite, necessitating as it does new methods and a special plant, should be kept entirely separate from present tin mining. These proved reserves of columbite of this type which can be economically mined at the current price are estimated at 15,000 tons. Also, there are still many similar areas to be prospected and there is much optimism that reserves will be substantially increased as a result of the current prospecting program. During 1953 new mill equipment was installed-primarily for columbite production-which included one Exolon magnetic separator and three air float separators. Also, additional earth-moving equipment was delivered comprising four Allis-Chalmers tractors, one Caterpillar tractor, four Euclid bottom-dump trucks and other sundry items.

The Mongu River hydraulicking scheme was completed in April 1953 by the laying of the main pressure pipe line some 26,300 feet in length along the left bank of the Mongu River from the 180 Dam.

The Amalgamated Tin Mines of Nigeria Ltd. was very active. Welding workshops at Bukuru were entirely reconstructed and enlarged and construc-

Nigerian Mineral Exports and Value for 1951, 1952, and 1953

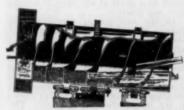
Commodity		1951	1	952		1953			
Community	Metric Tons	Value	Metric Tons	Value	Metric Tons	Value			
Tin Columbite Wolframite	11,753 1,092 46	£8,974,372 838,713 35,736	10,575 1,228 19	£7,665,521 1,306,588 30,839	12,136 1,855 14	£7,078,014 3,698,043 15,735			

tion of a new garage and stores department at Barakin Ladi were completed.
Oil storage installations, each including tanks of 100,000 gallons capacity, were erected at Kuru siding and at Bukuru where the construction of Euclid workshops were also completed and came into service.

Electric power restrictions were more severe than in previous years and cuts were occasioned by a defect in the Pelton wheel at Jekko Power Station. In February 1953, the low water in the Power Company's reservoirs forced a reduction of load of 1,000 kilowatts. Increasing restriction remained in force until the middle of the year and the delay in bringing into operation the second Jekko Power Station seriously affected production.



CIRCULAR AND RECTANGULAR CLARIFIERS



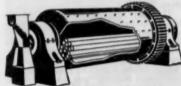
HEAVY-MEDIA SEPARATORS COUNTER-CURRENT CLASSIFIERS



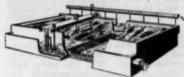
"GYROTOR" AIR CLASSIFIERS



TRICONE MILLS



CYLINDRICAL ROD AND BALL MILLS



AUTOMATIC BACKWASH RAPID SAND FILTERS



ROTARY KILNS



ROTARY COOLERS

HARDINGE COMPANY, INCORPORATED

YORK, PENNSYLVANIA · 240 Arch St. · Main Office and Works
New York · Toronto · Chicage · Hibbing · Houston · Salt Lake City · San Francisco

NORTHERN RHODESIA

Area 290,320 square miles Currency Unit. . Rhodesian Pound Capital Lusaka Value \$2.80 Chief Mineral Products-Copper, zinc, lead, cobalt, vanadium.

As may be seen from the accompanying table, in which Northern Rhodesian metal and mineral production and value have been listed for 1952 and 1953, the have been listed for 1952 and 1953, the 1953 production amounted to an increase of almost 20 percent in value over that for 1952. This increase is even greater than that for 1952 over 1951, the figures being approximately £71,-000,000 for 1951, £79,000,000 for 1952 and £95,000,000 for 1953. The increase is due partly to the larger tonnages of both blister and electrolytic copper and the increased average price obtained for copper over the period, and, to a lesser extent, to the very much greater output of cobalt metal from the new electrolytic cobalt plant of Rhokana Corporation Ltd. tion Ltd.

These gains were partly offset by the very marked decrease in the prices obtained for lead and, in particular, zinc. The tonnase output of zinc from Rhodesia Broken Hill did in fact increase, but the value dropped considerably. The output of lead was of the same order as previously, and during the year a new lead smelting plant was put into operation.

ation.

The drop in gold production and the failure to produce either gold or selenium were due to stockpiling of anode slimes produced during electrolytic copper refining at Rhodesian Copper Refineries and the new plant at Mufulira Copper Mines Ltd. The capacity of the new plant is 3,000 tons of electrolytic copper a month and plans have been made to extend this production to 6,000. made to extend this production to 6,000 tons per month in 1955 and to install a plant for melting down of cathodes and plant for melting down of cathodes and casting into electrolytic shapes. Construction of a new plant for the electric furnace melting of cathodes and vertical casting of electrolytic shapes is well advanced at Rhodesian Copper Refineries and it is expected to put the plant into operation during 1954. The initial difficulties experienced in operating the electrolytic cobalt plant of Rhokana Corporation Ltd. have been to a larger extent overcome as indicated by the increased output of cobalt metal, but it is hoped to increase production further during 1954, and the installation of ad-

during 1954, and the installation of additional roasters is planned.
Advances have been made during the year in underground operations at established mines, and among these mention should be made of plans at Mufulira Copper Mines Ltd. to install further underground crusher plants and sink three inclined winzes. At Nkana, Rhokana Corporation Ltd. is sinking a 1,500 foot sub-vertical shaft from the 2,140 foot level to develop deep copper and cobalt deposits. A ventilation shaft 2,140 foot level to develop deep copper and cobalt deposits. A ventilation shaft has been equipped with a large axial-flow ventilation fan of the vertical type. Ore was mined from the South ore body during the year, and the erection of a permanent headgear and auxiliary equipment for this ore body progressed. At the Mindola mine a new pump-chamber has been excavated at the 2,-930 foot level. Nchanga Consolidated Copper Mines Ltd. has decided to develop large scale open-pit mining in the near future; the ore developed will be lower in grade than that obtained from underground operations, but this will result in a grade of ore more in balance with ore reserves. with ore reserves.

result in a grade of ore more in balance with ore reserves.

Of the new mining operations Chibuluma Mines Ltd. is furthest advanced. Development has been assisted by an additional loan from the Defense Materials Procurement Agency of the United States government, and it is hoped that copper production will commence sooner than 1956, as originally planned. A township of appreciable size has grown in the neighborhood of the mine. Development is proceeding at the Bancroft mine for which a £5,000,000 company has been formed, and the mine is expected to go into production before 1958. At Kansanshi some difficulty has been experienced with water below the 150 foot level, but an additional loan has been raised to enable exploratory work to continue.

An important discovery of pyrochlore in a carbonatite rock at Nkumbwa Hill in the Northern Province was announced during the year, and prospecting of this deposit is in progress. Prospecting in various areas has continued during the

year, and a successful Prospecting Symposium was held by the Northern Rhodesian Section of the Institution of Mining and Metallurgy, at which a number of interesting papers were discussed and subsequently published. Active exploration of the previously reported uranium deposits in the Mindola section of the Nkana mine has continued, and experimental work on the treatment of the ore has been pursued in the pilot plant of Rhoanglo Mine Services Ltd. at Nkana. Nkana.

Prospecting for coal has continued, and the discovery of an important de-posit in the Zambesi valley was an-nounced. Shortage of coal has continued to be an embarrassment to the copper mines, but plans to increase production from the Wankie Colliery in Southern Rhodesia which recently came under the Rhodesia which recently came under the control of the Anglo-American group, were well advanced. Power will be made available to the Copperbelt by the construction of a line connecting with a hydro-electric project in the Belgian Congo, and plans are going ahead for the advancement of a large scale hydroelectric project on the Kafue river.

NYASALAND

Area .	38,000 square miles
Capita	1 Zomba
	thern Rhodesian Pound
Value	\$2.80
Chief	Mineral Products—Kyanite,

In 1953, 2,000 tons of high-grade kyanite ore were produced from the kyanite development project of General Refractories at Ncheu. The only other mineral produced was corundum by small operators in the Tambani Hills, near the Mozambique border.

The main feature of 1953 was large.

main feature of 1953 was large scale developments of carbonatite ring-structures mineralized with radio-active

minerals or columbium minerals.

Under the new Radio-Active Minerals
Ordinance an exclusive prospecting grant
was made to the Minerals Research Syndicate covering an area of 30 square
miles at the Kankgangunde Hill in the Zomba District. Large scale development was carried out on a carbonatite plug, part of a ring structure which is mineralized with disseminated monazite.

Another exclusive prospecting grant was made to the London & Nyasaland Mining Corporation, a subsidiary of the London Tin Company, covering an area of 66 square miles situated on Lake Chilwa. Large scale development work was carried out on another carbonatite

was carried out on another carbonature ring structure carrying pyrochlore and monazite. Concentrating tests resulted in concentrate assaying 64 percent, and more, of combined Ta₂O₂ and Cb₂O₅. Nyasaland has large bauxite deposits, formed by weathering of orthoclase-horn-blende syenite in the Mlanje Mountains, on the Zomba Plateau, and on the Lychenya and Likambula plateaus. These hauxite deposits are of considerable inbauxite deposits are of considerable in-terest in conjunction with future planning for the electrification of the country.

Metal and Mineral Production in Northern Rhodesia in 1952 and 1953 and Value in Rhodesian Pounds

	Quan	tity	Value in £R				
Commodity	1952	1953	1952	1953			
Gold ¹	2,435	309°	30,204	3,817°			
Silver ¹	312,940	441	90,971	- Contract			
Cobalt [®] (metal)	635	7,886	71,145	883,200			
Cobalt [®] (alloy)	24,973	21.754	1,048,462	953,072			
Cobalt [®] (other)	34	21,754	395	48,366			
Copper® (blister)	200,808	210,061	45,373,431	51,749,000*			
Coppers (concentrates)	5,563	226	544,373	11,848			
Copper® (electrolytic)	111,555	152,520	26,463,604	38,263,875*			
Copper (other)	6.3		17,607	onlanders			
Iron ore®	5,943	2,169	5,943	2,169			
Leads	12,600	11,510	1,740,500	1,047,093°			
Manganese ore ⁸		7,129	6,321	39,824°			
Selenium [®]	29,793	*****	33,879	7.7000			
Tine (concentrates)	3,926 29,793 15.69 75.97	9.80*	8,632	4.958°			
Vanadium pentoxide2	75.97		56,976	-1000			
Zinc ⁸	22,890	25,330	3,792,975	1.897,030°			
Limestone ^a	272,094	231,577	122,442	104,210			
Mica ⁶ (sheet)	35,800	16,439	18,937	4,841			
Phyllite ^a	7,522	2,789	940	418			
Silica rocks	4,333	54,75	650				
Beryl ^a	7	4.86°	995	690			
		Total value	£79,429,381	£95,014,411°			

Preliminary, subject to adjustment. 1. Fine ounces. 2. Hundredweight. 3. Metric tons. 4. Pounds.

PORTUGUESE EAST AFRICA

(Mozambique)

Area 240,000 square miles Capital Lourenco Marques Chief Mineral Products-Uranium, Beryl, Columbite, Tin.

Currency Unit Mozambique Escudo Value \$0.0345

The year 1953 brought a revival of prospecting and exploratory activity for base metals in Mozambique. In addition base metals in Mozambique. In addition to a government mineral reserve in the Tete District which was created in 1952 for the purpose of a mineral survey to be carried out under the Portugese Six-Year Plan, the government has now declared a new reserve in the Mocuba area in the Province of Quelimane, comprising an area of 34,000 square kilometers. An aerial survey of this area includ-

area in the Province of Quelimane, comprising an area of 34,000 square kilometers. An aerial survey of this area including mozaic photography was carried out, as also was one covering the largest part of the 70,000 square kilometer Tete Mineral Reserve by the Aero-Service Corporation of Philadelphia. Geological ground parties directed by E. J. Longyear Company of Minneapolis are continuing the mineral survey on behalf of the Portuguese six-Year Plan.

Production of davidite, a refractory uranium ore continued throughout the year by four small operators in the Tete District. A 100-ton per day concentrator was erected by the Entreposto Commercial de Mocambique at the Mavuzi Mines near Tete. Small operators obtain the ore by hand sorting rich eluvial rubble, or with hand operated jigs. Pitchblende was also discovered in the area for the first time near the banks of the Zambezi River, and small shipments of high grade hand sorted ore continued through the year. Uranium ore was also produced in the Quelimane Province by the Emyear. Uranium ore was also produced in the Quelimane Province by the Empresa Mineira de Alto Ligonha as a byproduct of the extensive pegmatite workings. The ore consists of euxenite and samarskite and contains up to 14

and samarskite and contains up to 14 percent U₈O₈.

A revival of activity was noted in the Inchope tin fields. Small amounts of tin have been produced here since 1912. Shortage of perennial watercourses has

been the major drawback in this well been the major drawback in this well wooded area, which, however, has a considerable underground water drainage. A pilot mill was erected by Mr. De Lima on the tinfields of the Sociedade Mineira do Inchope to treat the greisen ore. High-grade gravity concentrates were produced containing an appropriate of the sociedade of the socidade of the sociedade of the sociedade of the sociedade of the so preciable quantity of columbite

Plans are being investigated by the Government Mines Department in Lourenco Marques to assist mechanization of the graphite quarries owned by a local syndicate in the Province of Njassa. Graphite occurs in veins in pre-Nama granites as well as disseminated in Basement gneisses. Njasa graphite is of ex-cellent quality and is equal to that from Madagascar.

A considerable quantity of beryl was produced by the Empresa Mineira de Alto Ligonha from numerous small vorkings dispersed over its 5,000 square kilometer concession in Quelimane. By-products were small amounts of bismuth ore, mica, and semi-precious stones. Large scale lepidolite production was started at the company's mine at Nahipa. Sluice boxes were installed to treat the rich columbite eluvial rubble

layers at the Muianne mine.

The first discovery of diamonds was made in December 1953 at Moamba, in the Lebombo Mountains, near the border with the Swaziland Protectorate.

The discovery was made in alluvial and the border with the Swaziland Protectorate. wash, but the presence of "Blue Ground" was established also. Several amphibole asbestos occurrences were discovered during the year in the area to the south of Macequece, and exploratory work has been started. The asbestos was found to be equal in quality to that from South

MINING **OPERATORS** McCarthy

AT Bessemer Limestone & Cement Co., Bessemer, Pa., one McCarthy unit (above) averages 90 ft. per hour, drilling through hard blue shale and sand rock 34 ft. deep. Blast holes are drilled on 18-ft. centers. Two men handle the whole job, including setup and moving. McCarthy drills operate with gasoline, diesel or electric power units . . . on all types of mounts. McCarthy "money-savers" can work for you. See your nearby distributor or write Salem Tool direct for further information.



SIERRA LEONE

Area 21,000 square miles Capital Free Town Chief Mineral Products-Diamonds, iron, chrome.

Iron ore, chrome ore and gold output all showed important increases in Sierra

all showed important increases in Sierra Leone in 1953 as compared with 1952. The Consolidated African Selection Trust has sole concession rights throughout the Colony for the mining of diamonds. The firm's production has suffered very seriously from the full impact of illicit mining and, as a consequence, sales for the year were reduced in value by some £430,000. As by far the larger part of losses fall on the Sierra Leone and British governments drastic security. and British governments drastic security measures are now being enforced with the full cooperation of the local govern-

The Sierra Leone Development Company Ltd., concessionaires for the mining of the rich hematite iron ore deposits in the Marampa district, celebrated, in 1953, the 20th anniversary of its first shipment of iron ore from Sierra Leone. Mine production for 1953 was 1,353,000 tons of which 1,228,000 were treated Currency Unit . Sierra Leone Pound Value \$2.80

and shipped before the close of the year. The company's staff numbers more than 3,000 of which only 70 are Euro-

Sierra Leone Chrome Mines Co., Ltd. Sierra Leone Chrome Mines Co., Ltd. (holder of the concession for chrome ore mining throughout the Colony) confirms the report that the newly installed reduction and concentrating plant (manufactured by Fraser & Chalmers) came into full production during 1953 and gave very satisfactory results. Shipments of chrome concentrates for 1953 of chrome ore and concentrates for 1953 totalled 26,505 tons and a still higher tonnage is forecast for 1954. Prospecting tonnage is forecast for 1954. Prospecting and development are responsible for much activity and an exclusive license to prospect for chrome ore throughout 28 square miles in the Kailahun district of the Southeast Province was recently granted to these concessionaires.

Judged from the only figures available, which give an output of 3,271 ounces for the first eight months of 1953,

Mineral Exports From Sierra Leone For 1948, 1951, 1952, and 1953

Commodity	1948	1951	1952	1953	
Chrome ¹	8,411	11,930	23,970	26,505	
Diamonds ^a	461,685	477,130	423,327	366,7384	
Gold ⁶	3,996	2,207	2,321	3,2714	
Iron ores	926,370	1,184,735	1,378,959	1,228,000	

1. Metric tons. 2. Metric carats. 3. Troy ounces. 4. First eight months.

total production for the year can quite easily show a 100 percent increase over 1952. This position reflects the incentive provided by Free Market prices for gold.

No bauxite has ever been mined in Sierra Leone but it is significant that

British Aluminium applied for and received an exclusive license to prospect for bauxite in an area covering 147 square miles in the Freetown and certain provincial areas.

SOUTH WEST AFRICA

Area 322,393 square miles Currency Unit Pound S. A. Capital Windhoek Value \$2.80 Chief Mineral Products-Lead, copper, zinc, diamonds, manganese.

It has been reported that in October 1953, a new diamond field was discovered in the territory.

Consolidated Diamond Mines continued its prospecting operations over extensive areas with successful results. The mining lease area of this company—one of the major diamond producers of the world—is about 60 miles wide and extends northwards from the mouth of the Orange River to beyond Luderitz, a distance of about 200 miles. The diamonds are in the gravel terraces of ancient beaches. The recovery is classified as to 98 percent gem, and balance industrial "stones."

The Industrial Diamonds Company owns the mining areas Atlantis Nos. 1 to 6 and Ophir Nos. 1 to 14 at Saddle Hill in the Luderitz district, as well as mining rights over 23,520 acres adjacent to those areas. Mining operations in the same areas yielded 26,877 carats equivalent to 50 carats per 100 loads in the year to 30th June 1953, compared with 20,672 or 30 carats per 100 loads in the previous year. In the third 1953 quarter, 4.346 carats or 41 carats per 100 loads Industrial Diamonds Company 4,346 carats or 41 carats per 100 loads were recovered. The company is sub-stantially interested in another South West African enterprise—Lorelei Copper Mines. The latter has proved an appreciable primary copper-bearing granodiorite formation on its property in the Luderitz district. A 100 ton-a-day flotation pilot plant was to be installed for tests on the most suitable recovery

methods to be adopted.

During 1953, the Tsumeb Corporation
Limited completed the erection of a
storage and loading plant at Walvis Bay:
the storage capacity is 20,000 tons of
copper, lead, and zinc concentrates and
5,000 tons of manganese ore; the loading
capacity is 300 tons per hour. As well
as handling the Tsumeb output, the
plant stores and loads ores and concentrates for other producers in the territory trates for other producers in the territory on a toll basis, including S.A. Minerals (manganese ore). The Corporation added two 9 by 7 foot ball mills and further flotation units to the mill and concentrator and thereby raised the caconcentrator and thereby raised the ca-pocity to 50,000 tons a month. Sinking the Corporation's De Wet Shaft and developing at depth were advanced. Tsumeh also initiated research into ger-

Tsumeb also initiated research into germanium recovery, which, if successful, will make it potentially one of the world's largest producers of the metal. After trial runs, the Uis Tin Company commissioned its new mill and concentrating plant late in 1953, and proceeded to build up the tonnage treated to the rated capacity of 1,000 tons per day. A Dings magnetic separator was installed to extract tantalite-columbite from the tin concentrate.

An unconfirmed report intimated that in the closing stages of 1953, Ventures Ltd. had taken options and was under-

Ltd. had taken options and was undertaking prospecting operations in ground contiguous with the holdings of South African Minerals.

Metal and Mineral Production and Value in Southern Rhodesia in 1951, 1952, and 1953

	1951		19	252	1953*	
Commodity	Quantity	£ Value	Quantity	£ Value	Quantity	£ Value
Gold ¹	486,907	6,053,727	796,731	6,165,671	501,057	6,400,000
Silvert	79,731	25,290	81,356	24,797	-	
Asbestos?	77,663	5,452,108	84,834	6,651,974	87,739	6,500,000
Beryl ^g	1,109	91,841	1,186	125,311	1,773.99	258,740
Chrome ores	330,989	1,530,998	861,839	4,279,440	463,029	-
Tin concentrates?	95.2	57,140	\$6.70	31,311	47.24	
Scheelite	234.8	293,126	429.5	513,135	343.8	343,823
Lepidolite ²			1,242	4,645	19,6428	79,308

Preliminary, 1. Fine ounces, 2. Metric tons, 3. Lepidolite, spodumene, and amblygonite.

SOUTHERN RHODESIA

Area 150,354 square miles Capital Salisbury Currency Unit . . Rhodesian Pound Value \$2.80 Chief Mineral Products-Gold, chrome, asbestos, beryl, lithium

Chrysotile asbestos was the mineral of greatest value in Southern Rhodesia in 1953. Production of 87,739 tons was valued at £6,500,000, superseding the value of gold. A number of small operators closed down during the year as well as a demands became more exacting. How-ever, large cross-fiber mines contained expanding and embarked on large scale de-velopment programs. The Johns-Manville Corporation operating through Rhodesia Asbestos Ltd., a company formed jointly with Southern-Minerals Ltd., Anglo-Huronian, Ltd., and the British Metals Corporation started on a \$6,500,000 program to produce chrysotile cross-fibre at a central mill to be erected to process the production from the Temerraire, Shashi and Sha-mala mines. The group continued geologi-cal survey of the Darwondale asbestos occurrences on the Great Dyke. A new main shaft was completed at the Ethel asbestos mine, while considerable activity was noted in prospecting and exploring by mine, while considerable activity was diamond drilling lesser known asbestos occurrence

The total value of 501,057 ounces of gold produced during the year, including premium sales, was £6,400,000. Expansion and developments were largely limited to established mines. Shaft sinking and development work continued throughout the year at the Pickstone and Olym-pus mines as well as exploratory work on the newly discovered lode in the Cam and Motor mine. A new modern reduction plant was put into operation at the Muriel

Chrome ore production suffered a serious decline from 861,839 tons in 1952 to 463,029 tons in 1953. The main reason for the decline was the inability of the railways to handle greatly increased tonrailways to handle greatly increased ton-nages and the primary necessity of dis-posing of part of the stockpiles accumu-lated during the previous year. Efficient mechanization of the Beira Port, Mozam-bique, decreased the loading time and 420,000 tons of chrome ore were loaded as compared with 299,000 in 1952. In view of the shortage of transport, the Ministry of Mines introduced a truck allo-cation quota for existing producers, discation quota for existing producers, discation quota for existing producers, dis-couraging new chrome ore producers un-til completion of the new Bannockburn-Pafuri rail link, which will divert more than half of Rhodesia's chrome ore pro-duction to the Port of Lourenco Marques, Mozambique. Irrespective of transport difficulties, significant developments were carried out at preducing mines. Two new difficulties, significant developments were carried out at producing mines. Two new shafts have been sunk at the Divide Chrome Mines; a HMS plant was erected by the Rhodesian Chrome Mines Ltd. at Selukwe. A modern flotation concentrating mill was erected by the Rhodesian Vanadium Corporation at the Vanad mine on the Great Dyke. This mill is treating eluvial chrome bearing soils as well as mine ore, producing high grade chrome concentrates. Rhochrome Ltd. increased production from its gravity mill at Dar-wondale and a number of small gravity concentrators were erected by small op-perators to produce chrome concentrates.

concentrators were erected by small opperators to produce chrome concentrates. Outstanding among base minerals production was Beryl, which rose to 1,773.99 tons valued at £ 258,740. An increase of 587.52 tons over the previous year, thus placing Southern Rhodesia among the world's leading beryl producers. There were just over 100 independent small beryl producers, operating mainly in the Salisbury District in the Mtoko, Fungwe, Miami and Karoi areas. However, the bulk of beryl production was from a glant pegmatite displaying unusual regularity of mineralization in the Bikita tin fields, 45 miles by road from Fort Victoria. The Selection Trust group embarked jointly with the American Metal Company and the American Potash and Chemical Corporation on a large scale development and exploration program through their Rhodesian subsidiary, Bikita Minerals Ltd. Apart from beryl, this giant pegmaritie contains lithium ores—petalite (LisO·AlsOs·6SiOs), lepidolite (lithium bearing mica), spodumene and amblygonite. The major part of Southern Rhodesia's total lithium ore production was derived from here, although a number of producers were active in the Salisbury District.

Columbite and tantalite concentrate production rose from 5.74 tons in 1952 to

Columbite and tantalite concentrate production rose from 5.74 tons in 1952 to 16.08 tons valued at £21,965. The most important source being the Bikita pegma-tites, but considerable eluvial deposits were discovered in the Fungwe area. Development is being carried out at Bikita and considerable production is anticipated

The weak tin market caused a drop in production of tin concentrates to 47.24 tons. However, renewed prospecting and exploratory activity was noticeable during the year. The N. V. Billiton Maatschapij embarked on a £300,000 development program and started construction of a gravity concentrator mill at the Kamativi

The main feature of 1953 was a sizable increase in prospecting, exploratory, and development activity in base minerals. The Rhodesia Copper Ventures continued systematic development in the Loma-gundi Copper fields. The Newmont Min-ing Corporation in conjunction with O'okiep Copper Company and the Tsu-meb Corporation, Ltd. embarked on a large scale diamond drilling and proslarge scale diamond drilling and pros-pecting program at the Copper King and Copper Queen mines. A copper concen-trator is being erected by the Messina (Transvaal) Development Co. at the Ukondo mine in the Sabie Valley, Small scale production of copper was started by retreating old copper ore dumps of the Falcon Mines Ltd. A small amount of crude copper ore was produced by the Headlands Copper mine.

SWA7II AND

Area .					6	,0	74	50	vare	miles
Capito	ıl .								Mb	abane
Currer	icy	U	nit					. 1	ounc	1 S. A.
Value										\$2.80
Chief			ra	11	Pro	bd	uc	ts-	-Asb	estos,

During 1953, mining activity in Swaziland was conducted at the Havelock Asbestos mine in the northwestern cor-

E. A. GODOY & CO., INC.

CUNARD BUILDING, 25 BROADWAY NEW YORK 4, N. Y.

SALES AGENTS REPRESENTING PRODUCERS OF

IRON ORES CHROME ORES MANGANESE ORES

ner of the territory, and by 10 small other companies or syndicates. Four of the latter produce the larger part of the tin output, five others produced or are about to produce smaller quantitites of tin, and one is producing barite.

The Havelock mine is one of the important chrysotile producers in the world. Output in 1953 was reduced somewhat, but the average price rose slightly from

but the average price rose slightly from the 1952 level.

the 1952 level.

The investigation of columbite mineralization was completed at mid-1953. The results indicated that the deposits did not warrant working on a large scale, but that they were more suitable for the small worker. A decision is still to be taken on opening portions of the area to prospecting. The final results of prospecting a columbite deposit in the Mbabane district yielded assays ranging from 12.5 to 36.1 percent Cb₂O₅, 1.0 to 4.5 percent Ta₅O₅, and 28.5 to 36.0 percent TiO₅.

Production of Minerals in Metric Tons in Swaziland in 1952 and 1953

Commodity	1952	1953
Chrysotile asbestos	30,104	34,769
Tin	40.49	40.17
Barite	455	445

TANGANYIKA

Area 362,688 square miles
Capital Dar es Salaam
Currency Unit Pound
Value \$2.80
Chief Mineral Products-Dia-
monds, gold, lead, mica.

The value of Tanganyika mineral production for 1953 shows a drop as compared with 1952, although it still remains the second highest on record.

The main reduction is in value of diamonds exported. This is due to the fact that the 1953 figures represent the value of diamonds produced and exported during the year, whereas the 1952 exports consisted of the production for the years 1951 and 1952 as well as a portion of 1950. The backlog was due to the dispute between the principal producer, Williamson Diamonds Ltd., over its

WORLDWIDE PROFESSIONAL DIRECTORY

AGENCE MINIERE & MARITIME S. A.

HERBERT BANKS JOHNSON

CONSULTANT

LUNDBERG EXPLORATIONS LIMITED institut Geologista & Goophysioli ecialty Airborne Electromagnetic, ladicactive & Magnetic Serveya. VICTORY BUILDING, TORONTO

JOHN F. MEISSNER ENGINEERS, INC. Consulting Engineers

Storage Methods Ship Loading Docks Conveyor Systems Crusbing Plants Materials Handling and

368 W. Washington St. Chicago 6, Ill.

HARRY J. WOLF Mining and Consulting Engineer
Examinations—Velvations—Management
420 Madison Ave., New York 17, N. Y.
Cable: MINEWOLF Tel.: PLaza 9-1700

sales agreement with De Beers. This started in 1950 and was not settled until

Good progress has been made by Williamson Diamonds Ltd. with its expansion scheme which it is expected will be completed during 1954.

Gold showed an increase in the number of ounces produced although this was offset to some extent by the steadily decreasing prices realised per ounce on the free market. By the end of the year the free market price had fallen to practically the same level as the unofficial price of \$35.00 per ounce.

A new gold venture is being started by New Consolidated Gold Fields, Ltd. the South African Mining House, in

by New Consolidated Gold Fields, Ltd.
the South African Mining House, in
partnership with the Colonial Development Corporation in the Musoma District of Tanganyika. Diamond drilling
has indicated several million tons of low
grade ore and underground exploration
is to be undertaken to check the drilling
results and determine the metallurgical
characteristics of the ore.

Makes Tubing Installation a Breeze!



One man can easily hang 100 feet of ABC Mine-Vent Tubing an hour. Here's why: Mine-Vent's patented snap-on couplings take only seconds to join sections . . . the joint is airtight. To hang Mine-Vent, simply string a messenger wire along roof, wall or timbers, slip Mine-Vent's simplified hangers into the tubing and attach to the wire.

The result is cooling fresh air brought to the working face as fast as the work progresseswith less time and effort to get it there. For improved ventilation at less cost write AMERICAN BRATTICE CLOTH CORP., 230 Buffalo Street, Warsaw, Indiana.



Tanganyika Exports and Production of Minerals and Their Value in 1952 and 1953

C		1952	19531		
Commodity	Quantity	Value	Quantity	Value	
Diamonds ⁸	331,344	£4,046,191	170,679	£2,100,000	
Gold (unrefined bullion)®	130,851	861,257	153,522	920,205	
Graphite (crude) ⁶			19	475	
Gypsum ^s Kaolin*	495 126	1,239	1,128 1,250	2,820	
Kyanite ⁶	126	1,370	1,250	12,014	
Lead concentrates	4 027	200 020	20	320	
Limes	4,837	399,829 840	6,075	472,218 1,624	
Magnesite ⁶	170	840	100	250	
Mica: sheet ⁶	107	142,674	78	106,312	
Mica: ground ⁶	14	254		,	
Mica: wastes	1	19	51	261	
Salt 6, T	4,483	42,273	5,629	55,378	
Tin concentrates	63 36	44,571	62 31	34,994	
Tungsten concentrates	36	45,371	31	24,541	
Totals		5,585,888		3,731,412	

Preliminary. 3. Metric carats. 3. Troy ounces. 4. Includes value of gold and silver contained in auriferous concentrates. 5. Long tons. 6. Metric tons. 7. Salt produced and sold for consumption in Tanganyika during 1952 amounted to 11,618 metric tons. Corresponding figures for 1953 not yet available.

Production of lead by Uruwira Min-erals Ltd. from its pilot plant showed an increase over the 1952 figure although the rise in tonnage of lead concentrates the rise in tonage of lead concentrates was to some extent offset by the lower prices realised. Good progress is being made with the construction of the new plant which is being financed by ECA. and will be capable of treating 1,000 tons of ore per day. It is expected that this will be in operation early in 1955. During the year a portion of Uruwira Minerals concession, which the company is unable to develop due to pre-occupation with the main development scheme, was sold to Katuma Ltd. This prospecting company is mainly financed by the well-known Patino group.

Carbonatite pipes containing the mineral pyrochlore, a source of columbium, are stated to have been found by the Geological Department, but little information as to their extent or grade has been made public as yet.

TUNISIA

Area 48,300 square miles	Currency Unit Franc
	Value \$0.0029
Chief Mineral Products-Iron phos	phate lead zinc

Tunisia is primarily a producer of lime phosphate, iron, and lead ore. A large part of the lead ore is smelted at the

mine.

The slight increase in production of iron ore in 1953 (1,057,000 tons, 977,000 in 1952) is due principally to the activity of the mine belonging to the Societe des Mines du Djebel Djerissa, where the production increased from 836,000 to 918,000 tons. The bulk of the exports went to Great Britain (57 percent) and to Italy (19 percent). The production of lead concentrate increased slightly (37,940 tons in 1953, 36,530 in 1952). The Djebel Hallouf mine put into operation a washing plant for the purpose of retreating the residue mine put into operation a washing plant for the purpose of retreating the residue (tailing) of the old plants. This will permit the mine to increase production. The three local smelters (Megrine, Djebel-Hallouf, and Bizerte) produced 27,180 tons of lead bullion, 25,500 tons in 1952. The output of zinc sulphide concentrate declined from 7,500 tons in 1952 to 6,620 in 1953. The Djebel Kebbouch

lead and calamine mine, and all of the other calamine mines (Bou Kehil, Djebel Azered, Sidi Ahmed) stopped operations.

Azered, Sidi Ahmed) stopped operations.

Like the Algerian phosphate mines, those in Tunisia have suffered from competition with richer American and Moroccan phosphate mines. The 1953 production of 1,718,700 tons was 24 percent under that of 1952 (2,264,640 tons). Tunisia exported 30 percent of its phosphate to France, 30 to Italy, 10 to Great Britain, and 6 to Spain. The principal producer, Gafsa, (1,101,000 tons in 1953—1,532,400 tons in 1952—and 1,108,770 tons in 1951) like the societe Pierrefitte-Kalaa Djerda and the Cie. Tunisienne des Phosphates du Djebel-M'Dilla, continued the study of new methods for producing richer ores.

The Hammam-Zriba fluorspar mine,

The Hammam-Zriba fluorspar mine, which produced 2,500 tons in 1952, closed down in June, 1953 as a result of the price reduction. The mine produced 1,600 tons in the first half of

UGANDA

Area 93,981 square miles	Currency Unit	Pound
Capital Entebbe	Value	\$2.80
Chief Mineral Products-Tin, tungster	columbite gold	

The value of the mineral production for 1953 showed a fall compared with that for 1952 mainly due to lower prices

realized for tin and wolframite. The mineral production is not likely to rise appreciably until the Kilembe mine mentioned below comes into production. In the Sukulu District, the Tororo Exploration Co. Ltd. comprising the partners Frobisher Ltd., Monsanto Chemicals Ltd., and Uganda Development Corporation, completed a program of sampling the soils of Sukulu and estimation of reserves of apatite, pyrochlore and magnetite. A new technique of rotary drilling with compressed air blast was used. Mineral dressing tests carried out by consultants in London have shown that marketable concentrates of apatite and pyrochlore can be made by flotation. Pyrochlore is of value as a source of Columbium.

Columbium.

In the Busumbu District, the Research Division of Uganda Development Corporation concluded a program of prospecting for vermiculite and iron ores at Namekara and large reserves of vermiculite of reasonably good ex-foliatable properties have been shown to exist.

In the Kilembe District financial arrangements between Kilembe Mines

In the Kilembe District financial arrangements between Kilembe Mines Ltd., Colonial Development Corporation, and Uganda Development Corporation were concluded and it is now proposed to bring the mine into production at the rate of 40,000 tons of ore per month. A copper concentrate and a pyrite-cobalt concentrate will be made at the mine. The copper concentrate will be railed to a smelter at Jinja to produce approximately 8,000 tons of blister copper annually and the cobalt concentrate will be treated at the mine by a roast-leach process to annually produce a high grade cobalt oxide containing some 900,000 pounds of metallic cobalt.

In southwest Uganda, interest in wolframite production was maintained, with an increase in output though of less value

In southwest Uganda, interest in wolf-ramite production was maintained, with an increase in output though of less value due to a decline in mineral price. Several producers have taken advantage of the Ministry of Materials guaranteed floor price. Due to a severe drop in the price of tin, many small workers have transferred their operations to columbite-tantalite properties to take advantage of the high prices and bonus offered by DMPA. Work on a pegmatite in Kinkizi resulted in production of a few tons of beryl and a little columbite and microlite but as opportunity for open pitting decreases, production will decline.

In other areas production of amblygonite has been resumed in Mmengo and due to the activities of a single operator in Mbale District, gold output has more than doubled that of previous years.

UNION OF SOUTH AFRICA

Area 472,550 square miles
Capital Johannesburg
Currency Unit South African Pound
Value \$2.82
Chief Mineral Products—Diamonds, gold, manganese, platinum, chrome, copper, uranium.

The importance of the mining industry to the economy of South Africa is proven by the fact that while it accounts for only about 13 percent of the national income, it contributes more than half, and gold alone for about 40 percent of the country's total exports.

Uganda Mineral Exports and Value For 1952 and 1953

		1952	195	3
Commodity	Quantity	£ Value	Quantity	£ Value
Amblygonite ¹ Bismuth ¹ Beryl ¹	3.58	3,178	20 tons 3.01	900 3,116 6,047 15,057
Columbite ¹	4.06 2.00	4,788 225	32.36 10.51	15,057
Lead ¹ Tin ¹ Wolframite ¹ Gold ²	154.37 131.81 181.2	107,188 220,299 2,374	128.68 158.11 478.8	70,845 166,692 5,837
TOTALS		£338,052		1268,494

1. Metric tons. 2. Fine ounces.

The shortfalls in labor, shortages in supplies including electric power, were reflected in a more or less general decline in individual gold ore reserves, large tonnages having been rendered unpayable through higher working costs and the resulting higher pay limit. However, productive operations were maintained, but the higher grade and yield did not offset the increase in costs. Earn-



HARDINGE COMPANY, INCORPORATED

YORK, PENNSYLVANIA · 240 Arch St. · Main Office and Works

New York · Toronto · Chicago · Hibbing · Houston · Salt Lake City · San Francisco

ings were also adversely affected by the severe reduction in revenue from premium gold sales. Many producers have now passed their peak, but the developing and new mines of the Transvaal and Free State will produce a much higher grade ore than the 1953 average, which yielded an average of 3.893 dwt. per ton milled. In the new gold mining areas, working costs at full production are likely to be higher per ton but lower

During 1953, exploration was extended in the Bethal area, to the east of the Far East Rand basin of the Witwatersrand.

Transvaal: On the Far West Rand, along the West Wits line, the Doornfontein mine started production in November at the initial milling rate of 40,000 tons per month. The West Driefontein mine increased its milling capacity further, resumed sinking the No. Shaft and prepared to sink the new No. 5 Shaft to serve the rich, deeper western sections. The Blyvooruitzicht, Libanon and Venterspost mines advanced their programs of shaft-sinking to the deeper levels.

Concerning the Klerksdorp area, it has been stated that the full extent of the potential gold and uranium resources of the region have not been heard and that it could look forward to a period of large scale expenditure on capital works. During 1953, the Stilfontein mine almost completed reduction plant extensions to a monthly capacity of 90,000 tons a month and averaged 70,300 tons monthly in the final quarter. Vaal Reef horizon development disclosed consistently high values in the Stilfontein, Western Reefs, Vaal Reefs and Ellaton mines. Ellaton gold production began at the start of 1954. The joint No. 3 Shaft system of the Western Reefs and Vaal Reefs mines was completed and preparations were made to sink the No. 1 Vaal Reefs sub-vertical shaft.

Gold production in the Transvaal for 1953 and 1952 (the later in brackets) was: tons milled, 57,908,535 (61,540,-296); gold recovery, 11,509,353 fine ounces (11,594,271).

Orange Free State: Western Holdings, Freddies North and South entered the production stage from July 1953. Predominantly development rock was milled during 1953. This accounts for the yield being very much lower than what can be expected and what will be attained. The average 1953 Free State recovery was 4.061 dwt. per ton, compared with 3.722 in 1952, and with the 1953 Transvaal average of 3.887 dwt. per ton for the major mines.

Free State development values on the Basal Reef have in general exceeded expectations based on the borehole results. To the 30th September 1953, the total footage sampled was about 200,000 feet, 60 percent proved payable, and averaged 17.3 dwt. per ton over 24.2 inches or 419 inch-dwts, for all the mines returning results. By the end of 1954, the major task of opening up the Free State field will have been accomplished.

Five additional Free State mines are expected to reach the production stage

Metal and Mineral Production and Value for the Union of South Africa for 1951, 1952, and 1953*

101 1702, 1702, 1110 1700							
	19.		25	152		953	
Commodity	Quantity	£ Value	Quantity	£ Value	Quantity	£ Value	
Gold*	11,516,450	142,947,935	11,818,681	146,699,377	11,940,616	**147,564,994	
Diamonds*	2,163,170	16,344,937	2,383,211	14,776,482	2,717,620	13,992,729	
Silver	1,162,588	377,107	1,176,433	364,398	1,193,152	367,613	
Osmiridium ^a	6,883	243,478	6,141	250,959	6,966	228,695	
Copper ¹	38,533	8,420,316	38,705	11,608,000	39,440	9,278,594	
Tin1	808	837,129	1,591	868,000	2,400	963,267	
Antimony ¹	24,176	3,064,814	12,958	1,273,000	4,773	631,297	
Beryl ¹	897	93,826	413	42,560	531	88,895	
Bismuth ores	- 6	3,127	3		1	150	
Chrome ores	564.017	1.586,094	639,370	1,669,459	798,567	2,742,519	
Iron ore1	1,560,277	843,048	1,938,857	1,040,152	2,172,346	1,156,269	
Lead concs	919	73,743	866	48,000	706	15,827	
Manganese orel	704,133	3,175,099	964,127	3,800,000	912,339	4,506,240	
Tungsten conc1	203	177,548	271	236,828	421	170,113	
Andalusite ¹	12,530	25,866	21,477	79,000	11,772	63,910	
Asbestos ¹	101,229	5,448,548	133,839	7,600,000	94,817	4,757,540	
Baritel.	2,157	7,434	1,894	6,678	2,092	8,220	
Corundum ¹	5,030	94,701	4,179	96,000	1,865	45,79	
Fluorspar ⁴	12,056	55,876	11,343	60,000	16,029	76,88	
Graphite1	252	2,189	389	2,777	413	1,32	
Kaolin ¹	10,140	23,997	8,244	19,697	8,719	31,57	
Magnesite1	17,846	37,815	26,906	39,023	25,229	45,87	
Mica1	1,208	9,983	2,941	16,500	2,147	20,14	
Talc1	4,752	12,912	9,562	23,218	7,974	19,51	
Vermiculite ¹	24,324	131,908	39,918	191,000	33,844	218,91	

Records of the Government Mining Engineer.
 Includes £1,934,421 From Premium gold sales.
 Short tons. 2. Fine ounces. 3. Metric carats.

in 1954-Virginia, Presidents Brand and

in 1954—Virginia, Presidents Brand and Steyn early in the year; Harmony and Loraine later. These will be followed in due course by Free State Geduld, Merriespruit and Jeannette.

With the latter in brackets, the 1953 and 1952 Free State returns were as follows: tons milled 2,124,000 (1,206,000); yield 431,261 fine ounces, 4.061 dwt. per ton (224,412 ozs., 3.722 dwt. per ton); working revenue 50s. 6d. per ton ton); working revenue 50s. 6d. per ton (224,412 02s., 3.722 dwt. per ton); working revenue 50s. 6d. per ton (46s. 5d.); working costs 53s. 3d. per ton, 262s. 2d. per oz. (45s. 3d., 242s. 11d.) estimated working loss 2s. 9d. per ton (profit 1s. 2d.).

All the above returns exclude gold re-All the above returns exclude gold recovery from miscellaneous sources and from the small mines. Including this recovery, 60,032,768 tons were milled in 1953 for a recovery of 11,940,616 fine ounces of gold valued at £147,564,998, compared with the 1952 returns of 62,746,296 tons milled, a yield of 11,818,681 fine ounces of gold valued at £147,130,263. 130.263.

Through 1953, additions to the number of uranium-gold mines raised the total to 23, of which by the year-end five had reached the uranium production stage; namely West Rand Consolidated, Draggafontein, Blyvooruitzicht, Western Reefs and Stilfontein. The net profits amounted to £1,828,067, subject to adjustment. In addition, West Rand Consolidated has declared the interim adjustment of £107,-000. In the last few months of 1952, West Rand Consolidated declared a net uranium profit of £124,707, subject to adjustment. All the uranium producers experienced a reduced gold output, which can be attributed more to the labor and supplies shortage, especially power, than to the uranium operations.

During 1954, Randfontein, East Champ, Luipaards Vlei, Vogelstruisbult, Ellaton, New Klerksdorp Gold Estates, Afrikander Leases, and Babrosco in the Transvaal; Welkom, Western Holdings, Presidents Brand and Steyn, and Harmony in the Free State, are expected to reach the uranium producing stage. These will be followed later by Virginia, and Free State Geduld in the Free State; and by West Driefontein, Doornfontein, in the West Wits line; and by Dominion Reefs in the Klerksdorp area.

During 1953, South Africa's major diamond producing group—De Beers—continued sampling operations in the mines that had been closed down—namely Dutoitspan, De Beers Mine, Koffiefontein, Kamfersdam—and maintained sampling and productive corrections at Wesselton namrersdam—and maintained sampling and productive operations at Wesselton, Bultfontein, and Jagersfontein in the Cape and Free State near Kimberley, at Kleinzee in Namaqualand, Cape Province and at the Premier Mine near Pretoria, Transvaal. Sampling in the first group of mines has been undertaken to ascertain whether they could again be ascertain whether they could again be operated economically under such conditions as in 1953. A few small companies continued production from fissures in the Free State, near Boshof, Alluvial operations continued in the Transvam, Cape Province, and to a small extent in the Free State. New equipment was or-dered for the State Alluvial Diggings near the Orange River mouth in Namaqualand.

Manganese sales from the Potmasburg deposits, Cape, and from the Krugers-dorp deposits, Transvaal, advanced from the 1952 levels. Transport facilities improved in 1953 but again reduced expressible if full proved in 1955 but again reduced exports below what was possible, if full requirements could have been satisfied. Consequently, the stock tonnage increased further. The major companies have contracted large orders for future deliveries. Further deposits were located in the Potmasburg area, and other de-posits are likely to be discovered. South African reserves are considered adequate for many years ahead.

Copper is produced from the Messina Transvaal) and O'okiep deposits, the 1953 total of fire-refined and blister cop per being 39,844 tons (38,705); the bulk is exported. The Messina furnace capacwas materially increased. O'okiep Copper Company completed exploration drilling and is shaft-sinking in its Nababeep West orebody.

Consolidated Murchison-the sole South African antimony producer in the Transvaal-in 1953 confined development to a gold lens; broken stibnite ore being drawn from stopes as required. Cobbed ore and concentrate stocks were added to, but overall output fell to 4,773 tons (12,958); sales being 9,450 tons (11,229) at £631,-297 (£1,273,436).

Smelting on Site

MACE Furnaces

Sintering Hearths

Saves high transportation and treatment charges on your ores and concentrates.



The Mace Company

FIRE CONCENTRATION METALLURGISTS

2763 Blake Street, Denver S. Colo., U.S.A.

MINING TANKS



COOLING TOWERS . WOOD PIPE . ZINC BOXES Write for Free Catalog No. 48

PACIFIC WOOD TANK CORP.

San Francisco, U. S. A.

CHANGE OF ADDRESS

CIRCULATION DEPARTMENT

MINING WORLD with which is combined the Mining Journal 121 Second St., San Francisco 5, Calif.

Please change the address of my Mining World subscription

OLD ADDRESS

NEW TITLE OF POSITION

NEW ADDRESS

NEW COMPANY CONNECTION



MULTIPLE HEARTH FURNACE



ROASTING CALCINING DRYING

QUICKSILVER MAGNESITE IRON ORES COPPER ORES LIMESTONE MOLYBDENUM TIN ORES BONE CHAR NICKEL ORES DIATOMITE LEAD ORES SODA ASHES LIME SLUDGE FULLERS EARTH MAGNESIUM CLAY GRANULES ANTIMONY PYRITE

> SEWAGE SLUDGE LEAD CHEMICALS METALLIC SLUDGES FILTERING MEDIA And for Numerous Other Materials

PACIFIC LABORATORY FURNACE Manufactured in two sizes—36" and 54" inside diameters having 6-8-10 Hearths and include the same features as the commercial size furnace.

SIZES 8' 6" TO 22' 3" DIAMETER NUMBER OF HEARTHS, 1-16



Pacific Laboratory Furns



NEW PACIFIC FURNACING UNIT

Higher shell height. Three gas burners. Provision for conversion to muffle unit. Small volume roasts at any desired temperature.





1400 Se. Alameda St. 3100 19th St. Les Angeles

San Francisco

551 Fifth Ave

OCEANIA

AUSTRALIA

Area 2,974,581 square miles Currency Unit .. Australian Pound Capital Canberra Value \$2.24 Chief Mineral Products—Lead, zinc, gold, iron, tungsten, tin.

Production of most metals increased due, principally, to the completion of projects that have been under way for some years. Falling metal prices caused concern, especially to producers of tin, rutile, and tungsten, total value of minerals for the year being down by approximately 10 percent as compared with 1952. Estimated value, 1953, & A135,000,000 (Bureau of Mineral Resources)

Greatest emphasis was on the search for and development of uranium deposits. The Commonwealth Government decided to encourage private enterprise. It increased the price paid for uranium ore but earned criticism for what some consider unnecessarily stringent secrecy regulations. Many companies, some well established and others newly formed, are interested in Northern Territory areas likely to contain uranium ore bodies. The United States Atomic Energy Commission has agreed to buy the entire Australian uranium output for 10 years.

QUEENSLAND

Copper production commeaced in the new smelter of Mount Isa Mines Ltd., Mount Isa, during February. The trend of metal prices induced the company to produce the maximum of copper at the expense of some lead and, at year's end, ore hoisted through the shaft was 100,000 tons monthly for an output of about 1,700 tons blister copper, 2,600 tons silver-lead bullion and 3,300 tons zinc concentrate. Drilling of the main ore bodies and of other mineralized areas nearby continue to give encouraging results. There seems little doubt that great developments will take place at Mount Isa in coming years.

Mount Morgan Ltd., Mount Morgan, continued development aimed at stepping up copper production. Increased ore reserves give the mine a life of at least 20 years at present extraction rates. Current output is 550 tons of blister copper monthly containing 5,000 to 8,000 ounces of gold, plus 4,000 to 5,000 tons of pyritic concentrates for sale to sulphuric acid manufacturers.

NEW SOUTH WALES

Lead and zinc concentrate production increased considerably at Broken Hill. The mine of New Broken Hill Consolidated Ltd. treated 403,600 tons of ore. By 1956, it is hoped to increase ore output to 540,000 tons per year. At the opposite end of the lode North Broken Hill Ltd's. No. 3 shaft passed the 1,000 foot point during October. Planned depth is 5,000 feet, involving an estimated expenditure of £A4,500,000 by 1955. The Broken Hill field is yielding about 17,000 tons lead, 15,000 tons zinc and 750,000 ounces of silver per month. The N.S.W. Government Mines Department plans to search for uranium in likely areas near Broken Hill during 1954.

Beach minerals producers suffered as a result of the fall in rutile prices but output of rutile and zircon remained in the vicinity of last year's figures.

VICTORIA

Gold yield further improved to an estimated 72,000 ounces. Morning Star (G.M.A.) Mines N.L., which has a production record extending over 84 years, remains a leading producer with about one-seventh of the total output.

TASMANIA

The Electrolytic Zinc Company of Australasia Limited, Risdon, achieved a record zinc output of 90,000 tons. Zinc concentrates are from the company's mines near Rosebery (West Coast) and from Broken Hill, New South Wales.

Mount Lyell Mining and Railway Co. Ltd., Queenstown, increased its reserves in the West Lyell opencut to 46,500,000 tons. An expansion program which has been taking place for several years, will be further stepped up with the intention of milling 2,000,000 tons of ore yearly. Latest reported cathode copper output is the reserve of over 10,000 tons per year.

thilling 2,000,000 tons of ore yearly. Latest reported cathode copper output is at the rate of over 10,000 tons per year. King Island Scheelite (1947) Ltd., Crassy, King Island, achieved its objective before the end of the year by milling 5,000 tons of ore weekly; 20,000 tons of overburden are removed weekly also. In the company's year ended 31st October, overburden removed totalled \$12,220 tons while ore milled was 220,492 tons. Scheelite output of 1,280 tons compared with 1,000 tons in the previous

SOUTH AUSTRALIA

Good progress was made with the uranium mine and concentrator at Ra-

Australian Mine Production of Metals in 1951, 1952, and 19531

Metal	1951	1952	1953
Gold ⁰ Silver ⁰ Copper ⁰ Lend ^a Zinc ⁰	895,536	980,435	1,074,446
	10,978,191	11,278,374	12,000,000
	12,483	17,900	35,000
	197,913	219,100	260,000
	152,000	165,000	200,000
Tungsten Conc. 8, 4 Tin 8 Rutile Conc. 8	1,711	1,972	1,800
	1,459	1,700	1,450
	35,184	38,014	40,000
Zircon Conc. a	20,107	29,961	28 000
Iron orea		2,907,754	3,350,000

All figures from the Commonwealth Bureau of Mineral Resources, Geology and Geophysics. Those for 1933 are preliminary entimates.

2. Fine ounces. 3. Long tons. 4. Basis 65% WOs.

dium Hill. The establishment cost of the project, which was completed March 1954, is £A5,000,000. The uranium extraction plant at Port Pirie, costing a further £A1,500,000 is to commence production about May.

Due to the increased output of lead concentrates from Broken Hill, soft lead production increased at the plant of Broken Hill Associated Smelters Pty. Ltd., Port Pirie. Near the end of 1953, monthly output was over 18,000 tons. The smelter does not treat concentrate from New Broken Hill Consolidated Ltd. due to its bismuth content but receives concentrates from the other three Broken Hill mines.

WESTERN AUSTRALIA

Gold continues by far the most important metal from the western state which yields 75 percent of Australia's current output. Despite rising costs, production has increased. Great Western Consolidated N.L. at Bullfinch is now milling 33,000 tons of ore per month and recovering a little over 4,000 ounces of gold; while some older mines, such as Lake View and Star Ltd., Kalgoorlie, have achieved increased tonnage also, The Lake View Company, long Australia's leading producer, treated a record 720,000 tons during its last financial year. Ore grade is 4.81 dwts. per ton. High costs, especially for labor, have affected the gold mining industry more than most but there are signs that costs are levelling.

are signs that costs are levelling.

Iron ore despatched from Yampi Sound to Newcastle and Port Kembla, New South Wales, practically trebled, the estimated quantity being 750,000 tons. The ore is hematite averaging 63 percent iron.

Asbestos production by Australian Blue Asbestos Ltd., Witteenoom Gorge, was 4,000 tons, a record figure.

NORTHERN TERRITORY

Uranium mining and exploration aroused intense interest throughout the year and a score of companies are now mining for or engaged in the search for this element which appears likely to displace gold in popularity as a speculative investment. The main shaft at Rum Jungle reached 550 feet while open pit workings were also commenced. A sulphuric acid plant, to burn imported sulphur, is well under way and the treatment plant, to produce uranium oxide, is scheduled to begin operations in July 1954. Promising occurrences of uranium-bearing minerals were found at Coronation Hill, 230 road miles southeast of Darwin and at Katherine, 70 miles south of Coronation Hill.

of Coronation Hill.

Following extensive surveys by the Australian Aluminium Production Commission, 9,000,000 tons of bauxite with approximately 47 percent of available alumina have been proved on Marchinbar Island, 400 miles northeast of Darwin. This deposit is considered adequate for Australia's needs for over a century. There are indications of further large bauxite ore bodies in Arnhem Land on the Northern Territory mainland.

Progress was made on plant installa-

the Northern Territory mainland.
Progress was made on plant installation at Peko (Tennant Creek) Gold Mine N.L. The company decided to concentrate on the mining of copper ore rather than from the gold ore body and anticipates despatching a flotation concentrate to the custom smelter at Port Kembla, New South Wales during the second quarter of 1954. Tests are being made by the Dorr Company to determine the suitability of the concentrates for fluosolids roasting.

Area					7	,0	2	2	sq	var	e mi	les
Capito	ıl										. Su	va
Curren	ıcy	U	nit						Fij	ian	Pou	nd
Value												
Chief	M	ine	ra	F	re	00	lu	ct	5-	-Ge	old,	sil-
ver	n	201	nac	n								

Emperor Mines Ltd. and Lololoma (Fiji) Gold Mines N.L., both at Vatukuola, are treating, respectively, 31,000 and 13,000 tons of ore per quarter. Gold yields in 1953 from these tonnages were about 11,000 and 7,000 ounces. Emperor discovered ore of major importance during the year, developments on the No. 9 level revealing telluride carrying 9 dwts. During 1954, it is anticipated that gold and silver output will increase somewhat. First grade manganese ore exports are expected to be 10,000 tons. 10,000 to 20,000 tons of magnetite may also be exported in 1954.

Prospecting for pyrite, manganese and other metals was generally active during 1953. Copper ore shipments may com-

1953. Copper ore shipments may commence during the next year or two as a result of this work.

Production of metals in 1953 was: gold, 76,970 fine ounces; silver, 19,328 fine ounces; and manganese ore, 2,000 tons as reported by lands and survey

INDONESIA

Area 733,000 square miles
Capital Jakarta
Currency Unit Rupiah
Value \$0.2632
Chief Mineral Products—Tin, baux- ite.

Tin mining continued to be the most important mining operation in Indonesia

important mining operation in Indonesia in 1953. Mining of other metals was reportedly at a low ebb because of the nationalistic attitude of the government and the wage claims of the miners.

Indonesia continued to be the world's second largest tin producing country despite a reduction of output by 3.6 percent to 33,753 tons from the 35,003 tons in 1952. Output from Banca rose above 2,000 tons monthly toward the end of the year, Billiton's production was about the year. Billiton's production was about 800 tons monthly and Singkep output rose to 240 per month.

rose to 240 per month.

Bauxite production of the Billiton
Company at Bintang dropped to about
5,000 tons per month in September and
October. This was due to labor trouble
earlier in the year and also to slackening of demand in both Japan and Ger-

The Aime Company operated small manganese mines in East Priangan, Java. Sulphur mining in the volcanic crater,

Sulphur mining in the voicanic crater, Patoeah, stopped.

The Benkalis Gold Mines Company is rehabilitating its mines with governmental financial aid in the form of 90 kilograms of gold restored to the company to replace that amount taken by the Japanese during World War II. Fortunately the dredge and power plant proved to be less damaged than was expected. The gold mines of Simau and Southern Bantam have been abandoned by the owners and the only work has been by natives.

NEW CALEDONIA

Area 8,458 square miles	Currency Unit Franc
Capital Noumea	Value , \$0.0158
Chief Mineral Products-Nickel, chro	me, manganese.

The two principal mineral products of New Caledonia are the ores of nickel and chrome.

The year of 1953 was marked by very important increase in the proa very important increase in the production of nickel ore in New Caledonia. Total tonnage was 627,344, as compared with 394,670 tons in 1952 and 96,500 tons in 1949. The 1953 production surpassed the previous record of 478,000 tons established in 1940. Part of the production was exported (270,000 tons in 1953, 110,000 in 1952), principally to Japan (lower grade ore average 3.41 percent) and smaller quantities of richer to France average 5.60 percent.

The increase in nickel ore production was made possible by the installation of modern mining, transportation, and load-

was made possible by the installation of modern mining, transportation, and loading equipment by the most important company, Le Nickel.

Most of the ore is furnaced by Le Nickel. Three products are made: matte assaying 77 percent (5,650 tons 1953, 4,050 in 1952); cast nickel which is 26 to 30 percent nickel made in a water-

jacket furnace (8,200 tons in 1953-9,490 in 1952), and ferro-nickel assaying 26 to 30 percent, and made in an electric furnace (2,300 tons in 1953—200 tons in 1952). In order to increase its output, the company has constructed a third water-jacket furnace and has re-built an electric furnace which was formerly damaged.

The production of chrome ore in 1953 was 121,592 tons, 107,708 tons in 1952. The previous record of 89,000 tons was attained in 1949. The ore assays from 48 to 55 percent Cr2O5 and all is exported.

The production of manganese ore was started again in 1949, after having ceased for 20 years, and the 1951 production was 20,100 tons. Since then, there has been a steady decline in production: 16,600 tons in 1952, and 5,591 tons in 1953. It is shipped to the United

States and Japan.

In 1953, deposits of lead, zinc, and copper were found, as well as an alluvial deposit of tungsten ore (scheelite) in the Kouaoua region on the east coast.

NEW ZEALAND

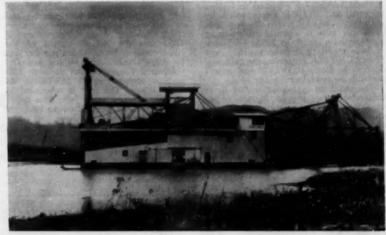
Area 103,862 square miles Capital Wellington Chief Mineral Product-Gold.

Gold continues to be the only metal of importance produced in the Dominion and even this industry seems faced with gradual decline unless unexpected dis-Interpretable times an inexpected dis-coveries are made. Dredges on the South Island accounted for practically the en-tire production estimated at 45,000 ounces in 1953. Peak yield was 185,665 ozs. in 1940. At this time, the famous Martha mine at Waihi, which ceased op**Currency Unit New Zealand Pound**

erations in 1952, was an important

factor.

Drilling in the Wairakei area, North Island, indicated that a geothermal power output of at least 20,000 KW is attainable from shallow holes. Tests of steam yields will be made between depths of 2,000 and 3,200 feet as it is believed that considerable power potential is available.



GOLD DREDGING in the Philippine Islands centers in the Upper Paracle River in Camarines Norte where Coco Grove Inc. operated this connected bucket line dredge "Mary Angus" during 1953.

TAIWAN (FREE CHINA)

Currency Dollar)	Unit			
Capital .				. Taipei
Area		13,900	oups 0	re miles

\$0.06 Mineral Products-Coal, gold, sulphur.

Coal is the most important mineral produced in Taiwan, Besides supplying domestic consumption there is a surplus for export, Production is under government control and is limited to an annual quota which is purchased entirely by the government for distribution. About 200,government for distribution. About 200,-000 metric tons of coal were exported to Japan in 1953. A program has been proposed to develop the important Nan-chuang coal field with its considerable reserves of excellent coking coal for metallurgical use.

metallurgical use.

Gold is one of the other important mineral products, but the output was somewhat reduced in 1953 due to a low and nearly-fixed price. With rising operation costs the marginal profit of gold mining would not encourage any further attempt to increase the production in 1954. There was an increase in electrolytic copper production in 1953 after the restoration of the main working levels in the Chinkuashih mine in 1952. Only cement copper was produced before this restoration. The production of electrolytic copper will be boosted in 1954 with further development of the mines. Since the completion of its flotation mill the Kinkwashek mine is the largest cop-

per and gold producer on the island. The copper concentrate is shipped to Japan and the pyrite concentrate is sold to a local fertilizer factory.

Production of sulphur and pyrite will be advanced in 1954, although both the quality and amount of sulphur products have been sufficient to meet the domestic requirements. Efforts are being made to increase the sulphur production to an to increase the sulphur production to an anticipated figure of 5,800 metric tons in 1954.

Production of Minerals in Taiwan During 1952 and 1953

Commodity	1952	1953
Gold ¹	1,031,947	739,307
Silver1	66,918	965,397
Placer gold ¹	1,149	1,035
Electrolytic copp	per® 720	475
Sulphur	5.054	2,728
Pyrite ⁰	33,822	22,724
Marbles	236,049	218,393
Talc ⁰	987	1,640
Graphite ³	700	1,328
Gypsum ^g	1,180	5,108
Dolomite®	763	1.873
Feldspar ^a	2.5	87
Mica	14,000	23,800
Coal ⁹	2,286,394	2,189,726

1. Grams 2. Metric tons 3. Kilograms.

PHILIPPINE ISLANDS

Area 11	5,707 square miles	Currer	cy Unit		Peso
Capital	Manila	Value			\$0.50
Chief Mineral	Products-Gold,	chrome,	copper,	iron,	manganese,

The year 1953 was again marked by

The year 1953 was again marked by an increase in the production of all metals (except copper and lead). This was due to: 1) improved mining methods, 2) mining of virgin ore bodies and 3) improved governmental conditions.

These factors are expected to further improve during 1954 accompanied by mounting public interest which is prophesied will result in a considerable mining boom in base metals in 1955. The value of base metal production in 1953 was Pesos 61,167,674, surpassing the gold production by Pesos 10,767,128 and it will probably be much increased in 1954.

The sad note in mining during these inflationary years is gold. In spite of favorable governmental action early in the year in eliminating the ad valorem tax and exempting the gold mines from the 17 percent excise and 7 percent com-

pensating tax on direct importations, three gold mines were forced to close during the year and others will follow unless some form of government subsidy will be available, Benguet Consolidated Mining Company, the largest, is expected to survive by increasing its milling capacity to 4,000 tons per day and by improving metalluray.

ing capacity to 4,000 tons per day and by improving metallurgy.

Highlighting new developments of 1953 was the commencement of the construction of its 4,000 ton per day mill by Atlas Consolidated Mining and Development Corporation at its huge 1.00 percent copper deposit at Toledo on Cebu Island. The mill is scheduled to commence operating in July. This is one of the mines of the A. Soriano interests. The firm is reported to have four other large low grade copper deposits slated for future production besides other de-

Production of Metals and Ores in the Philippine Islands For the Years 1949, 1950, 1951, 1952, and 1953¹

Commodity	1949	1950	1951	1952	1953
Gold ³ Silver ³ Chromite ³	287,844 218,419	333,991 216,034	393,602 274,602	469,408 693,751	480,657 575,027
Metallurgical Refractory Iron cre ² Copper ² Manganese cre ² Lead ³ Zinc ³	81,404 165,340 870,172 7,007 26,388 \$50	41,846 208,665 399,095 10,384 29,867 879	32,736 301,835 903,282 12,712 22,343 571 155	52,364 491,150 1,170,153 13,264 20,627 2,300 1,596	88,541 14,056,470 1,217,864 12,713 21,500 2,434 747

1. Courtery Philippine Bureau of Mines. 2. In five ounces. 3. In metric tons.

posits including the high grade Mati iron mine in Davao on Mindanao Island which is already in the production stage. The decision of Elizalde and Company

The decision of Elizalde and Company to place a mill on its high grade Masera gold and copper deposit in Davao will also add to the metal production of 1954. A number of other companies will also go into production. At present there are 22 base metal producers.

Of considerable international interest

Of considerable international interest is the active entrance of Japanese firms into the mining of base metals in the Philippines. Prewar, Japan was buying fron from Larap, Camarines Norte; and copper from Rapu Rapu Island. During 1953, the Pacific Mining Company Ltd., headed by E. Namikawa who directed Larance within a presenting in the Phil Japanese mining operations in the Philippines during World War II, has been investigating various base metal deposits investigating various base metal deposits with the purpose of mining promising ones. Among others, the firm entered into an operating contract with the owners of newly located copper claims in Western Bontoc which is north of the Lepanto copper mine in northern Luzon Island. Pacific Mining also hopes to find a practical metallurgical method of treating the ore in the large nickeliferous iron deposit owned by the government in Surigao, Island of Mindanao.

Another major development of the

Surigao, Island of Mindanao.

Another major development of the year was the discovery of further extensions of the copper deposit of Lepanto Consolidated Mining Company, the largest copper mine in the Far East and also the discovery of the probability that a copper mineralized area extends far to the north into Western Bontoc. In 1953 Lepanto produced 26,419,206 pounds of copper and 47,833 ounces of gold.

The presence of copper and managements.

copper and 47,833 ounces of gold.

The presence of copper and manganese deposits as well as molybdenum prospects in several provinces of the Philippines was disclosed by Benjamin M. Gozon, Director of Mines, following a report of the strategic mineral survey under the F.O.A.-Philcusa program.

Gozon said large deposits of manga-

under the F.O.A.-Philcusa program.
Gozon said large deposits of manganese in the Anda peninsula of Bohol are now being studied in detail "to prove the vertical as well as the lateral extent of the deposit." To date, he said, about 250 hectares has been surveyed in detail detail.

The strategic mineral survey project of the Bureau of Mines announced the following program for the fiscal year

1954:

1) Expansion survey and drilling of manganese deposits in Bohol; 2) Geological survey and drilling of the manganese deposits in Baybay, Leyte; 3) Drilling of the copper deposits in Negros Occidental; 4) Drilling of the chromite deposits of the Florannie property, Camarines Sur; 5) Drilling of the chromite deposits of Opol, Misamis Oriental Mindanao; 6) Re-examination of the Surigao laterite fields for locating high concentrations of nickel and reserves thereof; 7) Geological and mining investigations of several dormant chromite deposits of

7) Geological and mining investigations of several dormant chromite deposits of Cambales province, Luzon.

An aerial survey of six iron ore resources in five provinces is being made to insure an adequate supply of the mineral for the Philippines steel industry.

The areas being surveyed are Laman, Hoccas Norte: eastern Buleage Laran.

The areas being surveyed are Laman, Ilocos Norte; eastern Bulacan; Larap, Camarines Norte; central Marinduque; Mati, Davao; and the area between Pagadian and Lake Wood, Zamboanga. The project, called a special aeromagnetic survey, will cost \$101,607, to be paid by the F.O.A., and Pesos 46,806 to be drawn from the Philippine counterpart fund.

BURMA

Area 233,492 squ	are miles	Currency Unit Kyat
Capital	Rangoon	Value \$0.21
Chief Mineral Products-	Wolframite,	tin, lead, zinc.

With the exception of the Tenasserim Division of Lower Burma, in 1953 the Government of Burma regained control of the mineral producing areas in the Shan States and that part of the Ka-renni State where the Mawchi wolframite mine is.

In the Tenasserim Division of Lower Burma the Thaton, Tavoy and Mergui Districts are still in the hands of insur-gents and dacoits. The tin and wolfram-ite deposits are only found and mined in these districts. There conditions are so hazardous that in the Tavoy District and the greater part of the Mergui District the Government of Burma will not permit the European mine staffs to reside at the mines, nor even to visit them. The only exception being the staff of the Thabawleik Tin Dredging Ltd., on the Thabawleik River.

Burma Mines Ltd., jointly owned by Burma Mines Ltd., jointly owned by the Burma Government and Burma Corporation Ltd., is working a lead-zinc-silver mine in the Shan States. The firm reports that the labor force is increasing slightly and that the new men are set-tling down, and beginning to show in-creasing efficiency. A steady increase in ore extraction is being maintained, the-production for December 1953 was over 4 000 long tons that being helf the ter-4,000 long tons that being half the tar-

get figure Mawchi Mines Ltd., a large tin wolf-ramite mine in the Karenni States was under the control of the Karen rebels from 1948. It was liberated by the Burma Government military forces during December 1953. The property is reported to have escaped damage during the fighting, and that the two hydroelectric power stations and the telephone system are still in working order. Further, the mine equipment is in good condition, and the British staff are well and unharmed.

and unharmed.

In the Mergui District the Thabawleik Tin Dredging Company is the only
company with a tin dredge at work in
Burma. During the year its production
was 542 long tons of tin concentrates.

In the Tavoy District the mines were
operated by locally-trained staffs. No
dredges were working.

The Consolidated Tin Mines of Burma
Ltd. have a number of leases producing

Ltd., have a number of leases producing a mixed tin-and-wolframite concentrate, which requires magnetic separation. During the year this company exported wolframite 280 long tons, tin 41 tons and 144 long tons of mixed tin-and-wolframite concentrates, which includes mine production and local purchases. This company has an electro-magnetic separator

plant in Tavoy.

Kanbauk Mines Ltd., is working a mixed tin-wolframite deposit, about 50 miles north of Tavoy Town. Their export for the year was 84 long tons of wolf-

ramite and 46 long tons of tin.

The Tavoy Tin Dredging Corporation
Ltd. has one dredge at Theindaw on the Tenasserim River, not worked during the year, remaining on a maintenance basis.

Anglo-Burma Tin Co., Ltd. holds the largest known tin deposit in the Tavoy District which only worked on a petty District which only worked on a petty tributing scale. In the Mergui District, however, two of the company's leases were worked under an agreement with the Thabawleik Tin Dredging Ltd. As soon as conditions permit it is thought steps will be taken to get into production at an early date as the plant etc., is interest. is intact.

The principal varieties are the ruby, sapphire, star sapphire, cat's eye, zircon, and topaz. All gem stone mining is seasonal, being affected by the heavy monsoonal rains

During 1953 a small experimental electromagnetic plant was set up for recover-ing monazite from beach sands. Ilmenite ing monazite from beach sands. Ilmente as a byproduct is also recovered from this plant. There are reportedly extensive deposits of monazite and ilmenite and the Ceylon government has hopes that there will be important developments in this field, if the trial quantities which were shipped to the United States meet specifications.

HONG KONG

Area .	2 0		6 4		. 3	96	squa	re	miles
Capita	1 .						. Hor	ng	Kong
Curren	cy	U	nit	0	Ho	ng	Kong	0	ollars
Value					* * *				\$0.20
Chief									
tuno	ist	en.	. 1	re	n.				

During the year 1953 a three-foot seam of graphite was discovered on East Brothers Island, Drilling is continuing to prove the extent of the deposit. The grade of this graphite is very high as it is particularly free from clay and

Before World War II the Lin Ma Hang mine produced about 3,000 tons Hang mine produced about 3,000 tons of lead concentrate per month. Since the war, with the loss of all mechanical equipment and the flotation plant, a handful of miners have produced roughly 50 tons every month. There are other favorable lead deposits in the territories but so far no company has been

other tavorable lead deposits in the ter-ritories, but so far no company has been formed to mine them.

Tungsten production fell off during the year due to the low market price.

The average monthly production was 20 tons. By comparison in 1952 the average production was about 50 tons per month.

With an attractive market price the With an attractive market price the total production in Hong Kong can approach 75 tons a month. There is much unofficial mining. A fair estimate of the number of miners who, often on their own, are engaged in wolframite mining either officially or unofficially, is about 10,000.

There is one large lenticular mass of magnetite iron ore. This is situated at Ma On Shan and has a proved reserve of 9,000,000 tons. It is worked as an open pit mine. In 1953 there was an average monthly production of 12,000 tons. Almost the entire output is shipped to Japan with the exception of a small product to Taiwan. Another magnetite amount to Taiwan. Another magnetite deposit was being proved and is likely to have a comparable reserve to the Ma On Shan deposit.

On Shan deposit.

Molybdenum occurs in association with the tungsten deposits. Because of its low market value it is left on the dumps for anyone to collect. A relatively small amount of about a thousand pounds was marketed in 1953.

Generally 1953 saw a falling off in mineral production because of low prices. With the refugee miners from China there is a large labor supply preared to work at almost any price in

pared to work at almost any price in order to live. Given more attractive prices the monthly outputs of all the minerals mentioned could be trebled in a very short time.

Tin and Wolframite Exports From the Tavoy and Mergui Districts of Burma in Long Tons for 1953 Including Destination of Shipments

			Destination	1953 shipm	ents	
Commodity	District	United Kingdom	New York	Straits	Continental Europe	Total 1953
Tin Tin	Mergui Tavoy	150		732 436	10	732 596
Wolframite Wolframite	Mergui Tavoy	25 203	26 1,235	11	142	1,580
Mixed (tin and wolframite)	Tavoy	134	235		12	381

CEYLON

Area 25,332 square miles	Currency Unit	Rupee
Capital Colombo	Value	\$0.296
Chief Mineral Products-Graphite, g	jem stones.	

The Ceylon mining industry during 1953 continued in a very depressed condition as its principal product, graphite, suffered another setback for the second year in succession. The present prices compare so unfavorably with those of 1951 that there is little incentive to produce between minimum requirements. duce beyond minimum requirements. This downward trend has affected the industry to the point that many of the small mines have been forced to suspend operations. Whereas Ceylon is capable of producing up to 20,000 long tons of graphite annually, in 1953 only 7,218 tons were exported. In 1952 7,659 tons were exported and 12,621 tons in 1951. High grade graphite of both crystalline and amorphous varieties are produced. The entire production is graded, and a small proportion is dressed before export. The principal graphite mines are worked by Bogala Graphite Ltd., Kahatagaha Mines Ltd., and H. L. de Mel & Company

Ceylon produces practically all varie-ties of gem stones, except the diamond.

INDIA

Area .	9 0		1,5	7	8,	2	67	5	qu	are	miles
Capita	1 .								N	lew	Delhi
Curren	су	U	tie					. In	di	an	Rupee
Value											\$0.21
Chief	M	ine	ra	1	P	re	od	ucl	5-	-M	
alne	,	110	**,	8	U	14	9	100	۵,	***	nemire,

Improved transport facilities together with a good demand at higher prices enabled India to almost double its 1952 enabled India to almost double its 1952 iron ore exports to 878,000 tons in 1953. Japan was the largest customer and purchased about 288,000 tons, Germany was second and imported 113,000 tons. Other iron ore exported went to Czechoslovakia, Poland, and Belgium: most of it was shipped from the port of Calcutta. In general there was a good demand for all ores and minerals with exporters receiving higher prices as compared

receiving higher prices as compared

India's Exports of Minerals and Ores¹ in Metric Tons during 1952 and 1953

Commodity	1952	1953
Barite	2,366	2,179
Bauxite	2,463	2,082
Beryl	175	-
Chrome ore	6,210	16,091
Kyanite	25,441	14,875
Magnesite	38,643	45,475
Iron ore	494,000	878,000
Manganese ore	690,301	903,452
Mica blocks	1.269	1,403
Mica aplittings	5,167	5,300
Mica scrap	9,193	5,318
Mica-other qualities	697	277
Sillimanite	4,426	3,118
Zinc concentrate	3,300	4,100

1. Statistics only cover the ports of Bombay, Calcutta, and Madras.

Exports would have been stepped up further if adequate transportation facili-ties would have been available. The transport bottleneck, however, did ease to some extent towards the end of 1953.

ISRAEL

Area .								1	8	,C	C	C)	56	qu	ıc	180	0	miles
Capita	1															1	Te	1	Aviv
Curren	(5)	,	1	Ji	ni	it							l	sn	0	el	i	F	ound
Value																			\$1.00
Chief		M	ir	16	r	a	ı												

Production of phosphate was begun with about 30,000 tons being mined during 1953. A temporary concentrating plant was constructed for the purpose of increasing the grade to 28 to 29 per-cent P₂O₅. A few thousand tons of this concentrate were produced and exported to Italy and Japan. In the near future it is hoped to be able to reach a production of 120,000 to 150,000 tons annually. A calcination plant is being planned which would produce a highergrade concentrate containing 34 to 35 percent PaOs.

Potash extraction from Dead Sea brine has gradually been increased and at the present time has reached about 125 tons per day. Plans are being made for increasing this to 300,000 tons a year. The mining of glass sand and ceramic clays is being carried out on a small scale to cover the needs of Israel.

Israel's proven copper reserves reached 12,000,000 tons of ore containing 180,000 tons of copper. Possible reserves are estimated at 70,000,000 tons. Research is

in progress to determine the technical and economic possibilities of mining and recovering the copper. Leaching, with sulphuric acid is one of the methods which is being considered for extracting

which is being considered for extracting the copper from its ore.

Exploration is continuing for various other mineral deposits; mainly iron ore, manganese ore, and feldspar.

JAPAN

Area .				1	47	7,	6	9	0	1		Į	10	11	e		ni	les
Capita	1 .									*						T	ok	yo
Curren	icy	U	ni	t													Y	en
Value												4	C).	0	0	27	78
Chief	M	ne	ere	ıl	1	9	0	d	u	c	ts	_	_	C	h	ir	on	ne,
cop	per	, 1	ne	ın	g	al	n	01	56	١,	i	re) [١,		en	ne	ry.

Early in 1953, it was rumored that Japan's metal mining industry might be affected by uncertain economic condi-tions. Failure of the 1953 national budget and strikes in the chemical, fiber, and fetilizer industries caused a slackening of demand. Refinery stockpiles grew, but following passage of a new budget by the National Diet in September 1953 together with progress of power development plans, the picture brightened considerably. Increased demand from fabricators near the end of the year created a favorable outlook.

ated a favorable outlook.

A series of negotiations for the past four years between the government and gold producers succeeded, in August 1953, in freeing sales of gold provided that one-third of the amount of newly produced gold was secured by the government for the national monetary fund. The other two-thirds of the production

NOW-THE CLARKSON MODEL E REAGENT FEEDER IN RIGID PVC

- M ACCURATE
- ECONOMICAL
- CORROSION-PROOF
- WIDE FEEDING RANGE
- COMPLETE DEPENDABILITY

A PROVEN TOOL - A NEW FORM

The Clarkson Model E feeder, long a standard of the mining industry, is now offered in rigid polyvinyl chloride. Every part — even the screws and nuts — is machined or molded from pvc, the material which has achieved sensational industry acceptance because of its remarkable corrosion resistance characteristics. The Model E in pvc gives you the same high accu racy and low cost of other Clarkson feeders PLUS corrosion resistance that makes it an even more versatile and valuable industrial tool.

CRUSHERS

A complete line of sizes and types for crushing practically every material in the mining industry.

SEND FOR BULLETINS

HAMMERMILLS

Reversible Non-Reversible Dixie Standard Ring Type IMPACTORS

Reversible GRANULATORS

Ring-Type

BRADMILLS SINGLE ROLLS

DIXIE Non-Clog Single Rolls

BRADFORD BREAKERS BRADFORD HAMMERMILLS KUE-KEN JAWS

KUE-KEN GYRACONES



Room 1738

West Chester, Pa.

could be sold to gold fabricators at the

could be sold to gold fabricators at the purchase price of 555 yen per ounce. Demand for gold gradually increased, and the price was raised to 570 yen in October 1953. The increased demand did little to stimulate production because operating costs were, in general higher than 600 yen per ounce.

During the past four years in the copper industry, approximately 60 percent of the annual production was refined from scrap. Recent tendency is in the opposite direction. In 1953, the amount of copper metal refined from scrap was less than 30 percent of the output. Domestic producers have concentrated their efforts on the development of copper resources and increased output of copper sources and increased output of copper ore. The domestic price still, however, remains 30 to 40 percent higher than the New York City price.

In order to cut down the production cost of copper, leading producers undertook a study of smelting methods and some of them have started industrial operations. Soon after the completion of the hydrometallurgical plant at the Kosaka mine of the Down Mining Comsaka mine of the Dowa Mining Com-pany, Furukaw Mining Company sent a group of smelter superintendents to Finland to study pyritic smelting methods with a view to applying the methods to the company's smelter at Ashio. The Nihon Mining Company experimented with use of enriched oxygen at its re-finery, but abandoned the study in favor of the pyritic smelting method. According to company spokesman, the company has decided to apply the pyritic method in the expansion of its Saganoseki refin-

in the expansion of its Saganoseki refinery in Kyushu.

The Sumitomo Metal Mines Company started smelting copper ore directly in the blast furnace. All these companies are planning to import ore from other countries (Chile, Korea, Formosa, and the Philippines) and to custom smelt copper ores from Southeast Asia.

The Nihon Mining Company has been treating 5,000 to 6,000 tons per month of copper ore under a consignment contract with the National Government of Formosa since 1952.

Domestic development of copper

Domestic development of Domestic development of copper mines in Japan went forward in 1953. Sumitomo Metal Mines Company discovered a copper deposit at its Yoichi mine. The company also purchased the Yaso mine after World War II and following development work will construct a 200-ton mill in 1954. The Nihon Mining Company has discovered a promising vein at its Hitachi copper mine.

THE HASHEMITE KINGDOM OF JORDAN

Area	46,000	square miles
Capital		Amman
Currency Unit		Jordan Dinar
Value		\$2.80
Chief Miner		ducts—Phos-

Super-phosphate production in Jordan is in the development stage. Rich de-posits of phosphate are close to the Er-Roseifa railway station 18 kilometers north of Amman. During 1953 40,000 Production of Metals and Ore in Japan in 1951, 1952, and 19531

Commodity	1951	1952	1953
Copper (electrolytic) ² Lead (bullion) ² Zinc (electrolytic) ²	40,866 11,116	94,385 19,148	91,065 23,145 54,823
Zinc (distilled) ² Mercury ²	18,101 80.8	20,686 111.0	23,948 216.5
Antimony ⁸ Tin ⁹ Pyrite (ore) ⁸	221.2 433.4	543 786	1,187 858 2,296,389
Silvera Golda	143,320 176,900	185,722 209,210	187,314 228,143

1. Preliminary 2. Metric tons 3. Kilograms 4. Fine ounces

tons were mined and exported, compared with 6,686 tons in 1951. Production in 1954 is expected to reach 100,000 tons. Another deposit, is located 160 kilometers south of Amman.

A detailed survey is now being made on the country's reserves of potash, which is to be complete by the end of 1954. Present estimated extraction from Dead Sea brine is 100,000 tons annuspers.

Dead Sea brine is 100,000 tons annually; subject to an increase of as much as transportation will allow.

as transportation will allow.

Rich deposits of gypsum have been located at Wadi Mojib, 60 kilometers south of Amman. Large quantities are used in the local production of cement. Experimenting is now being done in the use of gypsum for the production of sulfuric acid.

sulfuric acid.

Development in manganese at the Dana Cayon (Wadi) deposits, 180 kilometers south of Amman is in progress to determine the amount of reserves. When results justify commercial production, the ore will be mined on a large scale and shipped through Aquaba, port on the Red Sea.

The presence of uranium in the form of carnotite has been reported. Exploration is also being done for iron, copper, and other minerals.

MALAYA

Area 7,800 squar	re miles
Capital Kvala	Lumpur
Currency Unit Pound	Sterling
Value	. \$2.80
Chief Mineral Products—Ti gold.	in, iron,

General Templar's battle against the Communist forces was all but over at the end of 1953 and, for the first time since World War II, mining conditions were back to near normal. From an average of 45 "attacks" a month in 1951 and 18 a month in 1952-often resulting in death to mining men and damage to mines—only spasmodic attacks were suffered in 1953. This has been reflected in the return to prospecting—usually accompanied

1953. This has been reflected in the return to prospecting—usually accompanied by armed guards—and the easier recruitment of mining personnel in London. Tin output was only 584 tons below 1952. This was due to a very substantial increase in dredge production during the month of December to 2,906 tons—the highest monthly production by dredges since 1941. Nevertheless dredge production for the whole of 1953 was below that of the previous year for the second year in succession. Gravel pump producyear in succession. Gravel pump production was above that of the previous year for the second year in succession despite a decrease in the number of mines work-

ing.

Confidence in the present security measures combined with high prices is

stimulating the search for new deposits of columbite throughout Malaya and there is a hopeful outlook for the future. The Trengganu iron ore mine (oper-ated by the Eastern Mining and Metals

Company) again reported a yearly production of more than 1,000,000 tons in 1953. Two iron ore deposits in the Pahang and Perak areas were discovered but no estimates are yet available as to their extent nor are they yet in produc-

The Pahang gold mine produced 18,-283 troy ounces in 1953, and 19,806 in 1952. Situated in an isolated area, it felt the full cost of heavy expenditures on security measures against guerilla attacks and, quite understandably, suffered from

and, quite understandably, suffered from a shortage of labor. A new 50 years' lease on the concession to continue working this was granted by the Malayan government to the Raub Australian Gold Mining Co., Ltd.

The Pengerang bauxite mine in southeast Johore began production in June 1952 and, to the end of that year mined some 21,796 tons. The output for 1953 was 152,170 tons and there is every likelihood of a further substantial increase during 1954. Manufacturers of aluminum in Japan were willing buyers of all the in Japan were willing buyers of all the

Production of Minerals in Malaya in 1952 and 1953

Commodity	1952	1953
Tin ¹ Coal ¹ Iron ore ¹ Ilmenite ¹	\$6,838 314,922 1,055,506 21,968	\$6,254 286,364 1,062,678 26,570
Scheelite & Wolframite ¹ Columbite Bauxite Gold ³	68 47 21,796 9,806	152,170 18,283

1. Metric tons. 2. Fine ounces.

REPUBLIC OF KOREA

Area	36,293	square	miles
Capital			Seoul
Currency Unit			Won
Value			
Chief Mineral	Produc	ts-Tun	gsten,
gold, bism	uth, ir	on, gro	phite,
monazite.			

In March 1952 impetus was given to Korean tungsten mining when the United States agreed to purchase the entire pro-States agreed to purchase the entire production of Korean tungsten concentrates. In November 1952 an agreement was made with Utah Construction Company for the management of the largest tungsten mines, including the Sang Dong and Dal Sung. The management agreement was later modified to one for technical assistance. The modified agreement has been so successful that Utah Construction Company has greatly enhanced the prestige of American engineering companies. The agreement has been adopted by Korea as a pattern for other contracts with a similar objective.

Modern equipment was installed at the Sang Dong, and new equipment previ-ously installed reduced mine costs by 20 percent. During 1953 mill equipment being installed is expected to increase mill capacity by 50 percent as well as to improve the capacity by 50 percent as well as to improve the capacity of prove recovery. A chemical plant (Synthetic Scheelite) is scheduled for early construction to increase recovery from 55 to an objective of 80 percent. Alterations and new equipment for refining bismuth at the Pusan bismuth works is to be installed to increase fineness of reduced metal to 99.9 percent. Production of monazite increased and

the grade of the concentrate was improved by electro magnetic separators, installed late in 1953. An assay office and ore testing plant neared completion at Taegu. The sampling of South Korea's extensive gold placers continued, and about 1,000,000 cubic yards of gravel valued at \$1.25 per yard determined. Extensive mining of the placer deposits is planned for 1954.

Of greatest significance was the identi-Of greatest significance was the identification of tin ore at the Samgunni mine, on the east coast near Ulchin. The deposit was first prospected by the Japanese as an iron mine, and abandoned because of its apparent low grade. In June 1953, a sample which was brought to the Minister of Compares and Laberty was Ministry of Commerce and Industry was identified as cassitarite. The vein, reportedly 12-ft. wide showing 1 to 30 percent ore, outcrops for over a mile and

identified as cassitarite. The vein, reportedly 12-ft. wide showing 1 to 30 percent ore, outcrops for over a mile and persists to the valley floor, 1,000 feet below the highest outcrop. Sufficient ore is exposed to justify a 30 ton pilot plant to treat ore which should average over 3.0 percent tin that will be mined during development. Samples and specimens of tin ore from other localities indicate that tin will be an important metal product of Korea, and that the Samgunni is not an isolated occurrence.

Aware of the value of mining in the economic reconstruction of Korea, the Ministry of Commerce and Industry has a program whereby, it is predicted, the production from South Koreas' 200 mines, and innummerable prospects, will free Korea from the requirement of foreign aid. The plan proposes construction of custom mills located in the several mining areas. Money will be loaned to purchase and equip mines with modern machinery, loans to be repaid from the ore sold to custom mills. South Korea is presently deficient in milling facilities; there are only 12 mills, eight of which treat only tungsten ore, two graphite, and two copper, lead and gold.

THAILAND

Area			200	0,000	sque	are	miles
Capito	ıl .					Bar	ngkok
Currer	ıcy	Un	it .				Baht
Value							
Chief		nerc	I P	rodu	cts—1	ſin,	tung-

The tin mining industry of Thailand faced many difficulties in 1953. By the middle of the year, the decreased prices of tin forced many miners to close down or operate in higher grade ground. The

Production of Minerals in Korea During 1944 (peak production during Japanese occupation) and in the Republic of Korea in 1952, and 1953

Commodity	1944	1952	1953
Golds	330,776	18,636	15,882
Copper ores	no record	9,819	11,136 199 255 29 30 655 299
Electrolytic copper ⁶	2,546	3.4	199
Lead ore?	no record	366	255
Lead bullion ⁹	6,996	127	29
Zinc bullion ⁰	6,838	312	30
Bismuth concentrate®	0	312 279	655
Bismuth metal ³	0	17	299
Iron ores (51% Fe)	441,941 23,979	20,577	18.971
Manganese ores (40% Mg)	23,979	7,416	3,058
Nickel ores	6.830	7,416 1.060	1,116
Tungsten conc.9 (65% WO ₂)	2,968 570	3,790	3,058 1,116 7,441 16
Molybdenite conc. ⁸ (90% MoS ₈)	570	11	16
Alunite [®]	141,569	1,180	100
Tantalite ores (60%)	0	17	0
Crystalline graphites	3,063	254	683
Amorphous graphites	3,063 40,739	14,806	683 18,744
Asbestos ²	3,186	0	(
Talc ²	3,186 7,723	3,764	8,599 7,705 15,888
Kaolin ²	31,935	1,766 9,830	7,709
Pyrophyllite ⁸	48,182	9,830	15,888
Flourite® (80% CaF2)	59,800	5,553	11,012
Columbite ⁸	0	950	1,100
Monazite ⁸	150	85	11,012 1,100 766
Tin ores (5% SnO ₂)	0	0	150

1. Troy ounces. 2. Metric tons. 3. Kilograms.

Import Control of mining machinery and supplies promulgated in November came at the most inauspicious time. However, the reduced rates of tin royalty proclaimed by the government prevented a large percentage of gravel-pump mines and dredges from closing down.

Three experimental mines equipped by the M.S.A. were also shut down be-cause of financial difficulties. Reconstruction of dredges at Kamunting Tin Dredging Ltd., Pangnga Section, and at Tongkah Harbour Tin Dredging Ltd., Ronpibon Section, proceeded throughout

Ronpibon Section, proceeded throughout the year.

Special mining leases in the sea off Bhuket Island were issued to Tromal Prospecting Ltd.

A slight increase in the 1953 tin output is estimated because many mines worked their richer ground in the second half of the year.

Plans were made for commercial production of lightle from the government.

rians were made for commercial production of lignite from the government owned mines at Ma Moh and Krabi. The government also set up a new department for the mining and smelting of the iron deposits in Kanjanaburi. Iron deposits at Koh Samui were investigated by Japanese geologists.

Production of Minerals in Thailand in 1952 and 1953

Commodity	1952	19531
Tin (long tons tin-in- concentrates at 72% Sn.)	9,473	10,000
Wolframite (long tons- concentrate)	1,601	1,600
Antimony (long tons- concentrate)	137	90
Lead (long tons-concentrate	2,421	8,200
Iron (metric tons-concentrate)	2,856	8,400

1. Figures for 1953 are estimates.

TURKEY

Area 296,190 square miles
Capital Ankara
Currency Unit Turkish Pound
Value \$0.3571
Chief Mineral Products-Chrome,
copper, manganese, iron, emery.

During 1953 erection of a sulphuric acid plant was started at the Murgul copper mine. It will use all the reverberatory and converter gases and will produce about 60,000 tons of acid yearly. Acid production will start early in 1955 and will be sold to the superphosphate plant at Iskenderun, recently erected by the Fertilizer Corporation of Turkey.

At the Keciborlu sulphur mine the erection of a new flotation mill was almost completed. It will start operation early in 1954 with new sulphur refining facilities.

The Keban lead mine and flotation mill was started in 1953 and produced about 1,000 tons of concentrate. It will produce more than 3,000 tons of lead

and zinc concentrate in 1954.

At the Karabük Iron and Steel works erection of a centrifugal cast-iron pipe plant was completed. Extension of steel making and rolling facilities was started towards the end of 1953.

Production of Minerals in Turkey in Metric Tons in 1951, 1952, and 19531

Commodity	1951	1952	1953
Bituminous coal	4,729,589	4,846,000	5,600,000
Lignite	1,258,404	1,387,000	1,580,000
Iron ore	225,810	481,000	478,000
Chromite	619,420	684,000	750,000
Copper (blister)	17,526	23,330	23,757
Antimony	5,168	2,320	1,120
Lead ore and concentrate	1,452	3.047	11,705
Manganese	50,517	100,000	88,000
Magnesite	305	891	
Sulphur	7,390	8,381	9,775
Boracite	12.015	13,730	6,200
Emery	7,363	8,239	6,400

1. Estimated, 11 months actual.

FEDERAL MINING AGENCIES

UNITED STATES ATOMIC ENERGY COMMISSION DIVISION OF RAW MATERIALS

The Division of Raw Materials, one of the several operating divisions of the United States Atomic Energy Commission, is responsible for uranium procurement from both United States and foreign sources and as a part of its procurement program carries out exploration activities at home and abroad. Domestic field operations are largely centered in the Grand Junction, Colorado Operations Office of the Division. This includes uranium production and procurement activities in the western United States and exploration activities on the Colorado Plateau. The New York Raw Materials Office provides staff direction for the exploration program of the Grand Junction Operations Office and directs the exploration program elsewhere in the United States as well as in foreign

The scope of the exploration program was broadened during the year to include new areas in which prospecting activity has intensified as a result of the discovery of uranium mineralization. Sub-Office of uranium mineralization, Sub-Offices were established in these areas staffed with geologists who conduct airborne and ground reconnaissance of the territory, make geological investigations of the newly reported finds, and in general, as-sist uranium prospectors in the area. New sist uranium prospectors in the area. New offices were set up during the year at Albuquerque, New Mexico; Phoenix, Ari-zona; Douglas, Wyoming; and Ishpeming, Michigan. Previously established offices Michigan. Previously established offices are listed in the accompanying directory. The Commission's policy is to encour-

age the exploration for and development of our domestic uranium resources by private enterprise by providing guaranteed minimum ore prices and bonuses for the initial production of uranium ore. Domestic Uranium Program Circular 5, Revised, originally placed in effect on March 1, 1951, provides guaranteed mini-mum base prices for uranium-oxide conmum base prices for uranium-oxide content of carnotite-type and roscoelite-type ores produced on the Colorado Plateau. The price schedule ranges from \$1.50 to \$3.50 per pound of U3O8 content, depending upon the grade of the ore, with certain allowances and premiums. In September, the Commission extended the expiration date of Circular 5, Revised, from March 31, 1958 to March 31, 1962, in a move to provide continued stability to the granium mining industry and to to the uranium mining industry and to

to the uranium mining industry and to encourage exploration.

At the same time, the expiration date of Domestic Uranium Program Circular 8 was extended from February 28, 1954, to February 28, 1957. This Circular, established March 1, 1951, provides a bonus for the production of the initial 10,000 pounds of uranium oxide contained in acceptable ores produced from domestic mines and delivered to qualified mills or Commission ore-buying stations. Bonus payments range from \$1.50 to \$3.50 per pound of U3O8 in addition to the payments received for the ore under Circular 5, Revised. The maximum bonus which lar 5, Revised. The maximum bonus which may be obtained ranges from \$15,000 to \$35,000 depending upon the grade of ore delivered. At the year's end in excess of \$2,817,000 had been paid out in bonus

payments, of which \$1,637,000 was paid out in 1953. Operators of 47 mining prop-erties have received full benefits under the program.

Recently, on January 29, 1954, the AEC issued Domestic Uranium Program Circular 7, which provides for the issu-Circular 7, which provides for the issu-ance of uranium mining leases on certain lands affected by the Mineral Leasing Act of 1920, particularly public lands covered by oil and gas leases. Such lands are not open to mineral entry under the mining laws, but the Circular makes it possible to develop and produce uranium ores from these lands under the Commission leases. The circular is a result of the discovery about two years ago that many claims had been staked for uranium on lands already covered by oil and gas leases.

Uranium ore had been produced from many of such locations and when the operator applied for a certificate of eli-gibility to receive bonus payments under Circular 6, he was denied the certifica-tion because his claim was invalid. The Commission, after consultation with the Bureau of Land Management, arranged a leasing agreement under which the uranium miner could continue to pro-duce and sell ore and be certified for the initial production bonus during the interim period in which the problem was

under consideration. Public Law 250, 83rd Congress, was Public Law 250, 83rd Congress, was passed to provide relief for those who unknowingly had staked claims on oil and gas leases, and the President signed the law on August 12, 1953. It provided for the validation of mining claims staked on oil and gas areas between July 31, 1939, and January 1, 1953, but does not validate claims staked subsequent to January 1, 1953. A 90-day period, ending December 12, 1953, was provided in which claim locators could validate their holdings. holdings

holdings.

Circular 7 was issued to provide a means for producing uranium from ore-bodies found on such lands subsequent to January 1, 1953. The Circular contains the requirements for applying for a lease which are similar in some re-spects to the requirements for filing a

ATOMIC ENERGY COMMISSION

Division of Raw Materials

WASHINGTON OPPICE

Washington Division of Raw Materials, 1601 Constitution Ave., N. W., Washington 25, D. C. STerling 3-806, Ext. 685
Assistant to Director: George C. Gallagher
Assistant Director, Domestic Production: James A. Barr, Jr.
Branch Offices and Fersonnel

PLORIDA OFFICE

FLORIDA OFFICE

Mr. James J. Koenig, Chief Florida Office,
Division of Raw Materials; Lee Building
Room 25, East Reynold & Palmer Streets,
Plant City, Florida. P. O. Box 1311.
Plant City 8-5055.

NEW YORK OFFICE
Dr. Phillip L. Merritt, Asst. Director, Division of Raw Materials: 70 Columbus
Avenue, New York, New York. P. O. Box
30, Ansonia Station. Plaza 7-3600.

DENVER, COLORADO

Mr. Charles C. Towle, Jr., Chief Denver
Exploration Branch, Division of Raw
Materials: Building 40, The Federal Center, Denver 15, Colorado, P. O. Box 7647,
Lakewood, Colorado, Belmont 3-3611,
Ext. 6873.

Exponentials; Buna...

ter, Denver 15, Colorado. .

Lakewood Branch. (Ask operator.

Lakewood Colorado.)

Ext. 5873.

HOT SPRINGS, BOUTH DAKOTA

Mr. John W. King. Acting Chief Hot
Springs Stoppings
and Personnel
BUTTE, MONTANA
Mr. Leonard D. Jarrard, Chief Butte Suboffice, Division of Raw Materials; Room
315, P. O. Building, Butte, Montana.
P. O. Box 1984, 2-7011.
PHOENIX, ARIZONA
Mr. Thomas W. Oster, Chief Phoenix Suboffice, Division of Raw Materials; Ellis
Building, 137 North Second Avenue,
Phoenix, Arisona. P. O. Box 4336, Commerce Station. Alpine 2-2381, Ext. 216
and 217.

merce Station. Alpine 2-2381, Ext. 216
and 217.
18HPEMING, MICHIGAN
Mr. Lealie P. Barrett, Chief Ishpeming
Suboffice, Division of Raw Materials;
Room 2 Fost Office Building, Ishpeming,
Michigan. F. O. Box 119. Ishpeming 142b.
GRAND JUNCTION, COLORADO
Mr. Sheldon P. Wimpfen, Manager Grand
Junction Operations Office; U. S. Atomic
Energy Commission, Grand Junction,
Colorado. P. O. Box 270. Grand Junction
3000.

mineral location. Copies of the Circular may be obtained from any of the offices indicated in the accompanying directory

The Commission continued the several services which it maintains for the uranium prospector. These include the free sample examination service the placing on open file at various depository libraries of certain geological and mineralogical reports, and the posting at all Commission Exploration Offices and cer-tain United States Geological Survey offices of monthly maps showing areas

of high radioactivity revealed by airborne reconnaissance and, in some cases, by ground reconnaissance. The details of these programs and other information of interest to the uranium prospector are found in the pocket-size booklet, "Pros-pecting for Uranium," which may be pecting for Uranium," which may be purchased for \$0.55 from the Superin-tendent of Documents, United States Government Printing Office, Washington

25, D. C.

A new pocket-size booklet recently has been published by the Commission

as an additional aid to the prospector. Entitled "Prospecting With A Counter," it was prepared by Robert J. Wright and may be purchased from the Office of technical Services, Department of Com-merce, Washington 25, D. C., for \$0.25. The booklet summarizes information on field counters, both Geiger and scintillation, their operations, use, abuse, and geologic problems. Special attention is given to the limitations of counters which miners and prospectors frequently fail to recognize.

UNITED STATES BUREAU OF LAND MANAGEMENT

The Bureau of Land Management is responsible for the administration of val-uable natural resources. Under its excluuable natural resources. Under its exclusive jursidiction are some 170,000,000 acres of public domain lands in the continental limits of the United States and approximately 270,000,000 acres in Alaska. It is responsible for mineral leasing on some 700,000,000 acres of federally owned lands, which include those withdrawn and reserved for other agency with as National Forests, or for classical states. withdrawn and reserved for other agency use such as National Forests, or for clas-sification and other purposes; and about 50,000,000 acres of privately owned lands on which the United States has the mineral rights; and about 30,000,000 acres of certain lands "acquired" through purchase or otherwise by other federal agencies

The dominant feature of public land policy is the belief that public resources should be developed by individuals act-

ing in the capacity of private citizens. In harmony with this principle and the public interest, the Bureau endeavors to en-courage the principle of free enterprise and individual initiative in the exploration, acquisition and development of such resources

The Bureau organization comprises a headquarters staff in Washington, D.C., and a field organization with offices located in the various States (and Alaska)

where substantial public land areas exist. The Director is the chief executive of the Bureau with a line of authority extending to the respective Division heads in Washington and to the various field

One of the headquarter's divisions is the Division of Minerals, which initiates and develops programs, regulations, pro-cedures, and considers legislation deal-ing with the rights under the mineral

leasing and mining laws. The Division conducts economic studies and participates in programs, frequently with private industry as well as other agencies concerning the exploration and production of minerals on the public domain. This Division consists of the Branch of Mineral Leasing and the Branch of Mining. ing.

The Bureau administers the United States mining laws. These are applicable to public domain and National Forest lands in the States of Arizona, Arkansas, California, Colorado, Florida, Idaho, Louisiana, Mississippi, Montana, New Morte Novice North Develo Louisiana, Mississippi, Montana, Ne-braska, Nevada, New Mexico, North Da-kota, Oregon, South Dakota, Utah, Washington, and Wyoming, as well as the Territory of Alaska.

The vacant public lands mentioned. whether surveyed or unsurveyed, are open to prospecting and, upon discovery of valuable minerals, to location and purchase under the United States mining laws by citizens of the United States and those who have declared their intentions to be consistent or the contract of the United States and those who have declared their intentions to be consistent or the contract of the contra tions to become citizens.

The mineral deposit discovered must be such as would justify a person of or-dinary prudence in the further expendi-ture of his time and means in an effort to develop a paying mine.

The possessory rights acquired by the owner of a valid mining claim are of the highest order of property and may be sold, mortgaged, inherited and taxed without infringing upon the rights of the United States

Mining locations may not be made for deposits of coal, oil, gas, oil shale, so-dium, phosphate, potash (and in Louisiana and New Mexico, for sulphur) since rights to these minerals in lands belong-ing to the United States may be ac-quired only under the mineral leasing

In order to facilitate the actual procssing of applications for minerals under the mineral leasing acts and patent ap-plications under the mining laws, delega-tions of authority have been issued to the various federal land offices authorizing them to adjudicate such cases and issue noncompetitive leases except those on "acquired lands" and to proceed with on acquired lands and to proceed with mining cases up to and including the is-suance of final certificates. Under a cur-rent reorganization program, a study is in progress for the delegation of additional authority to these land offices in order to further expedite action on such cases and to localize the administration of mineral leasing and mining patents as close to the lands and people involved as may be

UNITED STATES BUREAU OF LAND MANAGEMENT

Department of the Interior

Washington 25, D. C.

Douglas McKay, Secretary of the Interior Orme Lewis, assistant secretary Directors Office, Washington, D. C.

DIRECTOR'S OF	PRICE
Tel. 3891	HIEF COUNSEL Parriott, James Jr. Tel. 4325
ASSOCIATE DIRECTOR Zimmerman, Wm. Jr. Tel. 4651	NFORMATION OFFICER Hazeltine, Mrs. Norma R. Tol. 3609
ARSISTANT DIRECTOR Pineus, William Tel. 3897	
DIVISION OF ADMIN	IISTRATION
	ATG. CHIEF, BR. OF RECORDS MANAGEMENT Johnson, Harold K. Tel. 2056
CHIEF, BR. OF MANAGEMENT PLANNING Barr, James A. Tel. 2884	Tel. 2036
DIVISION OF MI	
CHIEP Hoffman, Lewis E. Tel. 3811	CHIEF, BR. OF MINERAL LEASING Giller, Michael

A88T. CHIEF Drexilius, Charles R. CHIEF, BR. OF MINING Furr, Abe H
Tel. 3803 DIVISION OF LANDS

CHIEF Kifer, Russell S. ASST. TO THE CHIEF Senzel, Irving

Regions and Regional Personnel

REGION I, Portland, Oregon Regional Administrator, Guerneey, Wm. G. Tel. Ukiah 4511 Reg. Chief, Div. of Lands and Minerals, Hochmuth, Harold R., Tel. Ukiah 4511

monmuth, Harold H., Tet. Ukiah 4811
REGION II, San Francisco, California
Regional Administrator, Hoffman, Luther
T., Tel. Yukon 6-3111
Reg. Chief. Div. of Minerals Favorite,
Joseph H., Tel. Yukon 6-3111
REGION III, Billings, Montana
Regional Administrator, Wallace, W. B.
Tel. 4-4175
Reg. Chief, Div. of Minerals, Conrace,
Joseph C., Tel. 4-4178

REGION IV. Salt Lake City, Utah
Regional Administrator, Mock, H. Byron
Tel. 4-2552
Reg. Chief, Div. of Minerals, Vander Veer,
H. J., Tel. 4-2552
REGION V, Albaquerque, New Mexice
Regional Administrator, Smith, E. R.,
Tel. 7-1411
Reg. Chief, Div. of Minerals, Burnett, Wm.
H. Tel. 7-1417
REGION VI, Washington, D. C.
Regional Administrator, Price, Herman S.
Tel. Re. 7-1820 x 4294
REGION VII, Anchorage, Alaska
Regional Administrator, Puckett, Lowell M.
Tel. 4-1091

DEFENSE MINERALS EXPLORATION ADMINISTRATION

The exploration program of DMEA is of the Defense Production Act of 1950, as amended, and by delegation from the Director of the Office of Defense Mobilization. The authority to conduct the officiation program was vested in the Secretary of the Interior, and by him delegated to the Administrator of Defense Minerals Exploration Administra-

The Defense Minerals Exploration The Defense Minerals Exploration Program encourages private industry to take the essential first step in looking for domestic sources of minerals and metals which traditionally have been in short supply during times of emergency.

Under this program, DMEA participation projects in the cost of exploration projects.

pates in the cost of exploration projects authorized in contracts between private parties and the Government in accordparties and the Government in accordance with published regulations (DMEA Order I, March 7, 1952, Amendment No. 1, April 11, 1953, Amendment No. 2, May 15, 1953, and Amendment No. 3, November 3, 1953). The participation of DMEA is on the basis of 50 or 75 percent of the costs of the project authorized under the contract, depending upon the mineral or metal being sought. However, if two or more minerals with different percentage participation rates different percentage participation rates are being sought, the allowable percen-tage is apportioned between them. The costs allowed include those for labor, supervision, and consultants; workmen's compensation, employees' liability insur-ance, and payroll and sales taxes; oper-ating supplies and materials; operating equipment to be rented or purchased; rehabilitation or repairs of existing build-ings fixtures and continues. rehabilitation or repairs of existing buildings, fixtures, and equipment; construction of buildings, fixed improvements, or installations to be purchased, repairs to and maintenance of operating equipment, analytical work and accounting, and other costs, all of which are necessary and reasonable for the purpose of the exploration project. The costs of road repair or for building access roads necessary to conduct the exploration work are sary to conduct the exploration work are sary to conduct the exploration work are also allowable costs of a project. Projects are established on sound engineering and geological principles with definite plans of work to be completed, usually within two years, but this limit may be extended if justified in the opinion of the Administrator, by special circumstances.

the Administrator, by special circumstances.

Originally the DMEA program included a search for 34 strategic and critical minerals and metals in short supply. As the Korean emergency lessened the shortages of some of these minerals became less acute. In recognition of this immediate situation ODM, under date of April 15, 1953, issued a directive to DMEA to restrict exploration assistance to specified minerals and metals then in short supply. This action reduced the number of minerals eligible for exploration aid to 19. DMEA accordingly amended DMEA Order-1, May 15, 1953. ODM modified its directive of April 15, 1953, to permit processing of those applications for minerals deleted by the May 15 amendment, which were received prior to May 15, 1953. At that time there were some 80 such applications on file. Of these 90 which were received prior to May 15, 1953. At that time there were some 80 such applications on file. Of these 80 applications, 73 have been processed. Further restrictions by ODM, as to minerals eligible for exploration, were made by letter dated August 31, 1953, which further affected the exploration program.

During the calendar year 1953, DMEA received 395 applications for aid for exploration, bringing the total number of applications received since the beginning of the program to 2,041. The 2,041 applications include proposals for exploration projects located in 41 states and Alaska. During the calendar year 1953, 334 applications were denied and withdrawn, and, as of December 31, 1953, 105 applications were being proc-

During the calendar year 1953, 176 contracts were executed bringing the total number of contracts executed, since total number of contracts executed, since the beginning of the program, to 612. The 176 contracts executed during the year had a contract value of \$8,310,400, and the Government participation totaled \$5,124,583. The total of the 612 contracts executed, since the beginning of the program, is \$29,336,455, and the Government's share of the cost of these contracts is \$17,807,617. Of the 612 contracts executed, 289 have been cancelled or terminated, leaving 323 in force as of December 31, 1953. The total estimated cost of the 323 contracts in force was \$21,402,421, with Government participation amounting to \$12,752,343. ticipation amounting to \$12,752,343

ticipation amounting to \$12,752,343. In the event the project is successful in finding ore from which production may result, the Government's share of the cost is repayable from the net returns from any ore, concentrate or metal produced as the result of the exploration project within 10 years from the date of the contract. As of December 31,

1953, 90 projects have been certified by 1953, 90 projects have been certified by DMEA as discoveries or developments, 70 having been certified during the calendar year 1953. Of these 90 certified projects, 63 have been terminated or completed, and 27 are still being explored under their contracts. The total estimated cost for these 90 projects was \$3,830,547, of which the Government's share was \$2,308,630. However, the Government has spent to date only \$1,872,414 on these projects.

Small business, represented by indi-

Small business, represented by individuals, partnerships, and corporate enterprises, as well as more sizable operators, has had an active part in the program. The small operator has been attracted to highly strategic minerals not found in the United States in deposits of sufficient size to attract large companies. In the case of many of these minerals, the domestic production comes wholly from small operators. Maximum encouragement has been given to small operators because of the urgent need for the more critical and strategic min-erals. The role of small business in the program is exemplified by the fact that two-thirds of the contracts executed by DMEA are with small operators, mainly DMEA are with small operators, mainly individuals or partnerships. About one-half of the contracts call for total expenditures of \$24,000, or less, and approximately one-third of the contracts provide for the operator to spend less than \$3,000 of his own money to complete the contract.

DEFENSE MINERALS EXPLORATION ADMINISTRATION

Department of the Interior, Washington 25, D. C. REpublic 7-1820

SECRETARY ASSISTANT SECRETARY FOR MINERAL RESOURCES Felix E. Wormser ADMINISTRATOR C. O. Mittenderf

DEPUTY
ADMINISTRATOR ... Frank E. Johnson
SPECIAL ASSISTANT TO THE
ADMINISTRATOR .. George C. Selfridge
CHIEF COUNSEL ... J. L. Hofflund
CHIEF COUNSEL ... J. L. Hofflund
DIVISION ... Ernest Wm. Ellis
DIVISION ... Lawrence G. Houk

Douglas McKay DIRECTOR, IRON AND FERRO ALLOYS
DIVISION William 8, Martin

DIRECTOR, BASE METALS
DIVISION Willis R. Griswold

DIRECTOR, OPERATIONS CONTROL AND DIRECTOR, CONTACT ADMINISTRATION STATISTICS DIVISION Robert E. Adams AND AUDIT DIVISION Jay L. Chambers

FIELD TEAMS

Contacts for Field Investigations

REGION I, ALASKA xecutive Officer: S. H. Lorain—Tele-phone: Douglas—2170, Bureau of Mines, P. O. Box 560, Juneau, Alaska.

REGION II. WASHINGTON, OREGON, IDAHO, & MONTANA
Executive Officer: A. E. Weissenborn-Telephone: Temple—1434, South 11
Howard Street, Spokane 8, Washingto

REGION III, CALIFORNIA & NEVADA Executive Officer: H. C. Miller—Tele phone: Yukon—2-5800, 1012 Floo Building, 870 Market Street, Sai Francisco 2, California.

REGION IV, ARIZONA, NEW MEXICO, COLORADO, UTAB, & WYOMING Executive Officer: W. H., King-Tele-phone: Keystone-4151, Bureau of Mines, 224 New Customhouse Building, Denver 2, Colorado

REGION V, NORTH DAKOTA, SOUTH DAKOTA, NEBRASKA, MINNESOTA, IOWA, WISCONSIN, & MICHIGAN Executive Officer. A. B. Needham—Tele-phone: Fillmore—3612, 2908 Colfax

Avenue, South, Minnespolis 8, Minne-

REGION VI. KANSAS, LOUISIANA, OKLAHOMA, TEXAS, ARKANSAS, & MISSOURI Executive Officer: Clinton C. Knox— Telephone: 5344, P. O. Box 431, Joplin, Missouri

Missouri
REGION VII, TENNESSEE, NORTH
CAROLINA, SOUTH CAROLINA,
GEORGIA, FLORIDA, ALABAMA,
& MISSISSIPPI
Executive Officer: Robert A. Laurence—
Telephone: 5-5576, Boom 18, Post
Office Building, Knoxville 2, Tennessee

Office Building, Knoxville 2, Tennessee
REGION VIII, ILLINOIS, INDIANA, OHIO.
KENTUCKY, VIRGINIA, WEST VIRGINIA.
MARYLAND, MASSACHUSETTINIA.
NEW YORK, VERMONT, MAINE, NEW
HAMPSHIRE, CONNECTICUT, RHODE
ISLAND, NEW JERSEY, DELAWARE,
& PENNSYLVANIA
Executive Officer: W. T. Millar—Telephone: UNion 4-3100, Bureau of Mines,
Eastern Experiment Station, College
Park, Maryland

UNITED STATES BUREAU OF MINES

Bureau of Mines research on minerals and fuels during 1953 emphasized materials essential to national defense and nuclear energy programs. Collection and analysis of information on domestic and foreign minerals and their sources continued to provide a basis for estimating present and future metricals executive. present and future materials require-ments. Also in 1953, the Bureau com-pleted its first full year of operation un-der the new Federal Coal-Mine Safety Act, receiving wholehearted cooperation from industry and State mining depart-ments in enforcing its resolutions. ments in enforcing its mandatory provisions.

Manganese research moved ahead. At the Albany, Oregon, laboratory, silico-manganese was produced from rhodonite material, and at Minneapolis, Minnesota, the first pilot-plant trial was made of a new sulfatizing process for treating lowgrade Cuyuna range ores. Concentrating grade Cuyuna range ores. Concentrating low-grade manganese-bearing ore from Artillery Peak, Arizona, by flotation, then leaching it by a dithionate process, the Bureau obtained a product acceptable for making ferromanganese. The Bureau's process for reclaiming manganese from open-hearth slags was adopted by industry. industry on a semi-commercial

industry on a semi-commercial scale during the year.

Looking for ways to use the Nation's plentiful low-grade iron ores, the Bureau perfected a method of agglomerating slime concentrates into a suitable furnace product. Known reserves of iron ore were increased through investigations in the Birmingham Basin of Alabama and the Klukwan deposit in Alaska.

Deposits of molybdenum, tungsten, thorium, and uranium were investigated, and research was expanded on alumi-num, chromium, copper, lead, and zinc. The Bureau also contined physical science studies to increase mining effi-

During the year, the Bureau perfected a low-cost method of producing ferronickel from low-grade domestic nickel silicate ores, and developed ways to recover beryllium ores from domestic deposits. In addition, it furnished virtually all of the Nation's supply of metallic zirconium and hafnium. To help meet

zirconium and hafnium. To help meet defense needs, the Bureau resumed pro-duction of ductile titanium. Advances were made in research on synthetic mica, mullite, and talc block, and problems of asbestos and sulfur sup-ply were brought nearer solution. An important outcome of synthetic mica important outcome of synthetic mica re-search was development of a machinable mica ceramic of superior quality, and during the year industry showed in-creased interest in synthetic mica as a matrix for bonding abrasives and as a mica ceramic for jet engines.

The Bureau continued to seek im-

proved coal-mining techniques during 1953. Several American continuous-mining machines were tested, further experiments were made with an im-ported coal planer for bituminous mines, and improved methods were developed for increasing production and recovery of anthracite.

Having proved the technical feasibil-ity under American conditions of produc-

ing synthetic liquid fuels from coal on a demonstration scale by gas synthesis and coal hydrogenation, the Bureau shut down its demonstration plants at Louisiana, Missouri, in July. Emphasis then shifted to laboratory and pilot-plant studies to improve known processes and develop new ones. Laboratory research already has developed improved catalysts that were used to show the possibility of producing high-quality gasoline from coal in a single hydrogenation step. Other studies indicated that the cost of producing synthesis gas—carbon monox ing synthetic liquid fuels from coal on producing synthesis gas-carbon monoxide and hydrogen-might be reduced by gasifying coal under pressure.

Continuous gas-combustion retorting of Continuous gas-combustion retorting of oil shale began on a 150 to 250 ton-aday scale at Rifle, Colorado, during the year. Also at Rifle, shale-mining methods were improved. Laboratory experiments at Laramie, Wyoming, showed that high-temperature retorting of entrained oil-shale particles promises high shale throughput, flexible operation, and high-quality products.

The Bureau issued reports on petroleum-engineering and secondary-recovery

leum-engineering and secondary-recovery studies in key oil fields in seven States during 1953, and continued research on oil-recovery problems. Helium produc-tion reached a new high, and to meet increasing demands the Bureau reacti-vated its last standby helium plant.

Over 1,500 tests were made of per-missible and special explosives and haz-

missible and special explosives and hazardous chemicals, and explosibility of 80 different dusts was studied.

During 1953, the Bureau made more than 6,500 regular and check inspections of mines subject to Title II of the Federal Coal-Mine Safety Act, which requires precautions against disasters in coal mines regularly employing 15 or more men underground. Because of the excellent cooperation received from mine operators, labor, and State mining officials, compartively few mines were cials, compartively few mines were affected by orders requiring withdrawal of men. Such orders are issued when an of men. Such orders are issued when an inspector finds imminent danger of disaster or failure to correct previously noted violations of the law within a specified time. Although inspectors observed more than 7,500 violations of mandatory mine-safety provisions during the year, over half of these were corrected immediately and most of the others were corrected within the time limit specified.

During the year, three more States and Alaska entered into cooperative and Alaska entered into cooperative agreements with the Bureau for enforcement of the act. State and Federal inspectors jointly inspected a number of mines under these agreements, which totaled six by the end of 1953.

Bureau inspectors continued to visit small mines, which are exempt from the act's mandatory provisions, recommend-ing voluntary elimination of hazards. They also continued to investigate incourses in accident prevention and first-aid and mine recover aid and mine-rescue procedures,

aid and mine-rescue procedures.

In addition, the Bureau analyzed thousands of samples of mine atmosphere, gas, and dust, tested electrical and Diesel equipment for safe use underground, and studied mine-ventilation and reof-control problems. Work continued also on flood prevention in the Pennsylvania anthracite region and control of fires in inactive coal deposits.

UNITED STATES BUREAU OF MINES

Washington 25, D. C. Department of the Interior Douglas McKay, Secretary of the Interior Felix E. Wormser, Assistant Secretary-Mineral Resources

Pelix E. Wormser, Assistant Secretary—Mineral Resources

DIRECTOR

ASSISTANT
DIRECTOR
Thomas H. Miller
SPECIAL ASSISTANT
TO THE DIRECTOR
ASSISTANT TO THE
DIRECTOR
Harvid J. Blaman
CHIEF, OFFICE OF
MINERALS REPORTS
CHIEF FUELS AND EXPLOSIVES
DIVISION
Louis C. McCabe
CHIEF MINERALS
CHIEF COUNSEL
Donald G. Welsh
CHIEF, ADMINISTRATIVE
CHIEF, ADMINISTRATIVE
DIVISION
Washington Office of Chief Counsel
CHIEF, ADMINISTRATIVE
DIVISION
Washington Office of Chief Counsel
CHIEF, ADMINISTRATIVE
DIVISION
Washington Office of Chief Chief Counsel
CHIEF, ADMINISTRATIVE
DIVISION
Washington Office of Chief
Washington Office: Interior Building, Washington 25, D. C. Telephone Republic 7-1820

Regions and Regional Personnel

REGION I, ALASKA
Territory of Alaska
Regional Director: Sinclair H. Lorain;
Box 560, Federal Building, Juneau,
Alaska, Telephone, Doughas 3-8281.
REGION II, NORTHWESTERN
Idaho, Montana, Oregon, Washington
Regional Director: Stephen M. Shelton;
Box 492, Albany, Oregon. Telephone,
2000.

2000.

REGION III, SOUTHWESTERN
California, Nevada
Regional Director: Harold C. Miller;
1012 Flood Bldg., 870 Market St., San
Francisco Z. California. Telephone,
Yukon 6-3111, Ext. 2207.

REGION IV, ROCKY MOUNTAIN
Arisona, Colorado, New Mexico, Utah,
Wyeming

Wyeming Regional Director: John H. Enst, Jr.; 224 New Customhouse, Denver 2, Colorado, Telephone, Keystone 4151, Ext.

REGION V. NORTH CENTRAL Iswa, Michigan, Minnesota, Nebraska, North Dakota, South Dakota, Wisconsin Regional Director: M. E. Volin; 2908 Colfax Avenue South, Minneapolis. Telephone Filmore 3612, Ext. 296-297. REGION VI, SOUTH CENTRAL Arkansas, Kansas, Louisiana, Oklahoma,

Texas, Missouri except the Coal-to-Oil Demonstration Plant at Louisiana, Missouri Regional Director: Clifford W. Seibel; 814 Barfield Building, Amarillo, Texas. This region also has jurisdiction over the Navajo Helium Plant near Shiprock, New Mexico, and all pipe lines and other facilities connected with or serving those properties. Telephone, 3.7481

Region VII. SOUTHEASTERN
Alabama, Florida, Georgia, Mississippl,
North Carolina, South Carolina, Tennessee.
Regional Director: Paul Alieman: Hamilton Natl. Bank Bldg., Knoxville 2,
Telephone, 4-3207.

Regional Director: Harold P. Greenwald;
REGION VIII, NORTHEASTERN
Connecticut, Delaware, Illinois, Indiana,
Kentucky, Maine, Massachusetts, Maryland,
New Hampshire, New Jersey, New York,
Ohio, Pennsylvania, Rhede Island, Vermont, Virginia, West Virginia, and the
Coal-teo-Oil Demonstration Plant at Louisiana, Missouri.
Regional Director: Harold P. Greenwald;
4800 Forbes Street, Pittsburgh 13,
Pennsylvania, Telephone, Mayflower
1-4500.
REGION IX, FOREIGN MINERALS
Regional Director: Elmer W. Pehrson;
Interior Building, Washington 28, D. C.
Telephone, Republic 7-1820, Ext. 3881.

GENERAL SERVICES ADMINISTRATION

Among its many responsibilities the General Services Administration is re-sponsible for the acquisition of strategic and critical materials as authorized by the Strategic and Critical Materials Stockpiling Act and for the development and production of such materials as authorized by the Defense Production Act of

Activities in this connection are carried out by the Emergency Procurement Service of the General Services Administration. Operation of purchase programs and depots within the United States are under the direction of the appropriate Regional Offices of the General Services

Administration, subject to policy and technical direction from the Emergency Procurement Service in Washington.

The Materials Division of the Emer-

The Materials Division of the Emergency Procurement Service succeeded to the authority and responsibilities which were previously vested in the Defense Materials Procurement Agency. This division continues to plan and implement programs for the purchase and supply of strategic and critical minerals and metals—this includes negotiation and administration of contracts involving development projects.

projects.

The Purchase Division of the Emergency Procurement Service negotiates and

administers contracts involving materials from sources already in production. The Materials Research and Analysis Division is concerned with technical and

Division is concerned with technical and analytical problems having to do with the management of stockpiled materials.

Domestic development contracts negotiated in 1953 will increase annual production by approximately 30,000 tons of copper; 16,000,000 pounds of contained nickel; 500,000 pounds of molybdenite concentrates; 9,600 short tons of titanium sponge; 5,200 long tons of chrome; 24,-000 long tons of manganese, and 1,700,-000 results of graphite. 000 pounds of graphite.

The operation of domestic mineral pro-The operation of domestic mineral programs for the production and acquisition of asbestos, beryl, chrome, columbiumtantalum, manganese, mica and tungsten continued with increasing results during 1953. In carrying out these programs purchase depots are located as follows:

Asbestos Globe, Arizona
Chrome ... Grants Pass, Oregon
Manganese ... Butte & Philipaburg,
Montana; Deming, New Mexico; Wenden, Arizona

zona Mica, beryl and columbite-

tantalite . . Spruce Spruce Pine, North Carolina; Franklin, New Hampshire: Custer. South Dakota

In addition to the manganese purchase depots, a nationwide carlot manganese program is in effect whereby manganese meeting the required specifications is purchased f.o.b. suppliers shipping point. The tungsten program is a nationwide floor price program for tungsten concentrates which may be sold to the government f.o.b. carriers conveyance any milling point. point.

point.

During 1953 these domestic programs resulted in the acquisition by the government of 466,860 pounds of asbestos; 274,326 pounds of beryl; 27,520 cons of chrome; 5,158 pounds of columbium-tantalum; 163,778 tons of manganese; 156,373 pounds of block mica and 491,-845 short ton units of tungsten.

GENERAL SERVICES ADMINISTRATION

Administrator of General Services Edmund F. Mansure

EMERGENCY PROCUREMENT SERVICE

COMMISSIONER ... A. J. Walsh
SPECIAL ASSISTANT TO THE
COMMISSIONER ... W. M. B. Freeman
COORDINATOR OF SALES ... F. W. Witt
DIRECTOR, MATERIALS RESEARCH AND ANALYSIS
DIVISION ... T. V. Wilder

DIRECTOR, MATERIALS RESEARCH AND ANALYSIS
DIVISION ... T. V. Wilder

DIRECTOR, MATERIALS RESEARCH AND ANALYSIS
DIVISION ... G. K. Casto
DIVISION DIVISION J. S. Saltabury

GSA REGIONAL DIRECTORS

REGION I—
J. J. O'Connor, 620 Post Office & Court
House, Boston 9, Massachusetts.

REGION II— Walter F. Downey, 250 Hudson Street, New York 13, New York.

REGION III—
William A. Miller, Regional Office Building,
7th & D Streets, S. W., Washington 25,
D. C.

REGION IV— Harry E. Harman, Jr., Peachtree-Seventh Building, 50 Seventh Street, N. E., At-lanta 5, Georgia.

REGION V-John Skeen, U. S. Courthouse, 219 South Clark Street, Chicago 4, Illinois.

REGION VI— William A. Holloway, 1800 Federal Office Building, 911 Wainut Street, Kansas City 6, Missouri.

REGION VII— Karl E. Wallace, 1114 Commerce Street, Dallas 2, Texas.

REGION VIII—
Otto G. Klein, Building 41, Denver Federal
Center, Denver 1, Colorado.

REGION IX—
Robert B. Bradford, 4th Floor, 49 Fourth
Street, San Francisco 3, California.

REGION X-Orrin C. Bradeen, Federal Office Building, 909 First Avenue, Seattle 4, Washington.

UNITED STATES GEOLOGICAL SURVEY

The United States Geological Survey

The United States Geological Survey is held responsible for geologic investigations, topographic and geologic mapping, water investigations, public-land classification, and mineral-leasing supervision on leased public and Indian lands.

The Conservation Division's major functions are: (1) to examine and classify the public lands with respect to mineral and water-power resources; and (2) to enforce the mineral leasing laws. Vital supplies of hydrographons, phosphates, see supplies of hydrocarbons, phosphates, po-tassium compounds, sodium compounds, lead, zinc, and vanadium are obtained

from lands under Federal or Indian lease.

The Mining Branch, one of four Branches of the Conservation Division, Branches of the Conservation Division, is a regulatory and supervisory body responsible for the proper conduct of mine operations, including prospecting, development and production et coal, potassium, phosphate, sodium, silica sand, oil shale, and sulphur on public land leases; of gold, silver, mercury, vanadium, and quartz on various land grants; and of all minerals, except oil and gas, on segre-gated, restricted, and allotted Indian and acquired land leases. The Branch also

enforces the operating and safety regulations under the various mineral leasing acts pertaining to Federal and Indian lands in the United States and Alaska.

At year's end, December 31, 1953, there were 1,645 properties under supervision in 32 states and Alaska, whose yearly output had a value of approximately \$122,000,000. Supervision of the properties is effected through seven regional and district offices. The tonnage of products mined from supervised properties during 1953 is shown in the tabulation below:

Product	Tonnage Mined	1953
Coal	7,539,174	
Potash	7,462,130	
Phosphate	1,214,839	
Sodium	634,506	
Lead and Zinc Ore	1,485,523	
Miscellaneous	1,229,534	
Total	19,565,706	
Special and the Control of the Contr		

The Geologic Division is concerned with geologic investigations and appraisals of minerals and mineral fuels in the United States, its Territories and Possions, and in some foreign countries.

In the United States during 1953,

vestigations of metallic and non-metallic mineral resources included 79 projects. In addition, reconnaissance geologic map-ping and mine mapping was done in connection with mineral resources studies nection with mineral resources studies. Activities in cooperation with the United States Atomic Energy Commission, the Defense Minerals Exploration Administration, the Defense Materials Procurement Agency, the Department of Defense, and with many states were an important part of the minerals program. Mineral studies and geologic compilations continued in New York and the New England states, in the Arkansas-White-Red River basins of south central United States, and in northwestern California.

In the field of mineral fuels, geologic mapping and surface and subsurface stratigraphic projects were carried on in 20 states in areas where prospects for dis-covery of new sources of oil and gas look covery of new sources of oil and gas look promising. In addition, detailed mapping and calculation of reserves of oil shale were also continued in eastern Utah. Important coal—and lignite-bearing areas were mapped in Pennsylvania, Kentucky, Ohio, Indiana, Arkansas, Wyoming, Montana, Colorado, Utah and New Mexico. New estimates of coal reserves in North Dakota and Colorado were published in 1953. At the end of the year a new estimate of the coal reserves of Indiana, and a progress report on the status of and a progress report on the status of coal reserve estimates in the United States were in press and scheduled for release early in 1954.

Activities in Alaska included studies

on iron, tin, copper, tungsten, coal and oil, in addition to reconnaissance geologic

investigations, construction material investigations and studies of permafrost.

Geologic work on metallic and non-metallic minerals, fuels and ground water was carried on in cooperation with 19 foreign countries under the auspices of

the Foreign Operations Administration.

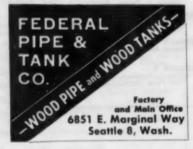
Photogeologic maps of approximately 13,000 square miles of the United States and Alaska were completed in 1953.

Contributing to the investigation of mineral resources were laboratory studies mineral resources were laboratory studies and research in geochemistry, petrology, paleontology, and stratigraphy. In addition to the fundamental background research program and the heavy load of tens of thousands of analytical, paleontologic and stratigraphic determinations, new methods were developed and new services instituted for geochemical prospecting tests, rapid rock analyses, sedimentary petrology services, geologic age determinations, geothermometry, and isotope geology. Airborne magnetic and ratope geology, Airborne magnetic and ra-dioactivity surveys were conducted in 15 states, ground investigations in 10 states and Alaska, as well as laboratory studies of the physical properties of rocks, theo-retical research and instrument development

UNITED STATES GEOLOGICAL SURVEY

Department of the Interior, Washington 25, D. C. Douglas H. McKay, Secretary of the Interior

Felix E. Wormser, Assistant Secretary for Minerals
DIRECTOR William E. Wrather ASSISTANT DIRECTOR Thomas B. Nolan ADMINISTRATIVE GEOLOGIST Arthur A. Baker
STAFF COORDINATOR John C. Reed INFORMATION OFFICER Herbert B. Nichols CONSERVATION DIVISION Chief of Division Harold J. Duncan
Mining Branch, Chief Acting Chief J. David Cerkel, Jr. Mining Branch, Chief J. D. Turner Regional Supervisors, Mining Branch: 1. Denver Region (Temporarily Vacant) Denver, Colo.
2. Billings Region J. R. Lerwill, Billings, Mont. 3. Carlsbad Region R. H. Allport, Carlsbad, New Mexico 4. Salt Lake City Region Bert W. Dyer, Salt Lake City, Utah
5. Mid-Continent Region Ernest Blessing, Miami, Okla. 6. McAlester District H. B. Lindeman, McAlester, Okla. 7. Eastern Region D. C. Abernethy, Washington, D. C.
GEOLOGIC DIVISION Chief Geologist
Assistant Chief Geologist, Acting
Engineering Geology Branch, Chief Edwin B. Eckel Geophysics Branch, Chief James R. Balsley Paleontology & Stratigraphy Branch, Chief Preston E. Cloud, Jr.
Fuels Branch, Chief Ralph L. Miller General Geology Branch, Acting Chief William E. Benson Geochemistry & Petrology Branch, Chief Earl Ingerson
Foreign Geology Branch, Chief
Chief of Division



PRODUCTS AND SUPPLIES

For Those 'HY-STEEL' **GRINDING BALLS**

Wasatch Ball Foundry, Inc.

Gr. Bulls Excl. Since 1935 531 W 7th So. St. Salt Lake City 4, Utah

ALLISON STEEL MANUFACTURING COMPANY

Mine and Mill Buildings . Mine Rails . Ore Cars . Steel Gallows Frames . Ball Mills . Muck Plates . Crucible Drill Steel

We offer a complete repair service to the Mining Industry. Our new Machine Shop is equipped to handle your work quickly and economically.

Hot Milling of All Types of Detachable Bits

SOUTH 19TH AVENUE ARIZONA PHOENIX PHONE Alpine 8-7731

PROFESSIONAL DIRECTORY

One-Inch Card, \$50 Yearly---1/2-Inch, \$35 Yearly. Payable in Advance.

CONSULTING ENGINEERS:

C. P. KEEGEL Mining & Metallurgical Engineer 707 S. 6th St. Tel 571 Las Vegas, Nevada

JOHN E. KELLY

CONSULTANT
IN NATURAL RESOURCES
LINCOLN 6-4100

207 CAPITOL TOWERS WASHINGTON 2, D. C.

Aerogeological Exploration Color Aerial Photography **Exploration Projects**

PHILIP A. LAYLANDER

Geologist

Bex 241

Fallon, Nevado

ARNOLD H. MILLER CONSULTING ENGINEER

General Mine, Mill and Industrial Appraisals, Plant Design, Mechanization.
Cable: "ALMIL" Tel. Certland 7-0635

120 Broadway

New York City 5, N. Y.

MURPHY, F. M.

Consulting Mining Goologist 1201 Maryland Parkway, Las Vogas, Nov.

RODGERS PEALE

Consulting Mining Geologist
315 Montgomery St. Sun Francisco 4, Calif.

FRANKLIN L. C. PRICE
Begistered Mining Engineer
Examinations— Valuations
1105 Herthern Life Tower—Tel, MAin 5134
Seattle 1, Wash.

ARTHUR R. STILL

Consulting Mining Geologist Room 24, Union Block Prescett, Arizona

> John Q. St. Clair Consulting Mining Geologist 586 Buchanan Ave. Norman, Oklahoma

MARVIN J. UDY

Inorganic Chemistry Electrochemistry Electric Furnace Smelting Process Metallurgy
Forre-Alleys, Colcium Carbide, Phosphorus 546 Pertago Road Telephone 2-6294 NIAGARA FALLS, N. Y.

MILL DESIGN & CONSTRUCTION

Send for Free Bulletin
O. W. WALVOORD CO.
401 High Street • Denver, Colorado

CLIFFORD R. WILFLEY Mining Engineer Consulting

2233 Grope St. Denver 7, Colorado

EAst 0298

CHEMISTS, SAMPLERS, SHIPPERS' REP'S:

ARIZ. TESTING LABORATORIES

CLAUDE E. McLEAN, REGISTERED ASSAYER
Analytical and Consulting Chemists
Box 1888 817 W. Madison St. Phoenix

B. W. DEASON **BLACK & DEASON**

Assayers and Chemists
Ore Shippers Represented at all Smelters
P. O. Box #1888 Salt Lake City, Utah

THE COLORADO ASSAYING CO.

ASSAYERS, CHEMISTS, and SPECTROGRAPHERS Est. 1900

Gold, Silver each \$1. both \$1:50, Copper 75c. Send for Free Copy of our Mineralegist's Pocket Reference Giving Detailed Information on All the Principal Ores. 2013 WELTON ST., DENVER 1, COLORADO

DICKINSON LABORATORIES

Assavers-Chemists-Metallurgists-Umpires Shippers Representatives at Local Smelters Representatives at Mexican Border
Points for Shippers of Manganese and Fluorspar 1300 West Main Street El Paso, Texas

GOODALL BROTHERS

ASSAYERS AND CHEMISTS SHIPPERS' REPRESENTATIVES
Established 1909

HANKS, INC., ABBOT A

ASSAYEES AND CHEMISTS
Supervision of Sampling at Smalters
Spectrographic Analysis
624 Sacramento St. San Francisco 11

HAWLEY & HAWLEY

W. E. HAWLEY, Mgr.
Assayers, Chemists, Ore Buyers
Shippers' Representative
P. O. Bex 1060
Douglas, Arizone

Ledoux & Co. (Inc.)
Spectrographers
Shipping representatives at all seaports and refineries in the United States
359 Aired Avenue Teaneck, N. J.

PETER MACK

Central and Umpire Assaying
Wallace, Idaha

Wood Assaying Co., Henry E.

Established 1878 ASSAYERS and CHEMISTS Denver 2, Colorado 2042 Broadway

SMITH-EMERY COMPANY

Established 1910

Assayers-Chemists Metallurgists Spectrographers Shippers' Representatives

781 East Washington Blvd., Las Angeles, Calif.

American Council of Commercial Laboratories

PRODUCTS AND SUPPLIES:

SCANDINAVIAN ORE

TANKERS, INC.
Public Ledger Bidg.
Philadelphia 6, Pa. COMBINATION ORE and OIL CARRIERS. MOST ECONOMICAL TRANSPORTATION AFLOAT, INQUIRIES INVITED

VAN WATERS & ROGERS INC.

Flotation Chemicals, Mining Reagents Largest and Most Complete Stocks in Northwest Seattle, Spokane, Portland, Boise

DRILLING COMPANIES:

R. S. McClintock Diamond Drill Company Spokane, Washington-Globe, Arlzona Diamond Core Drill Contractors Manufacturer of Diamond Bits and drilling accessories

DIAMOND DRILL

Contracting Company

5. 18 Stone

Spokane 15, Wash.

"DIA-HARD" CORE BARRELS

DIAMOND DRILLING SUPPLIES

Core and Churn Drill Contractors

POSSIBLE MARKETS-ORES - METALS - NON-METALLICS

-AS COMPILED BY THE MINERALS DIVISION, U. S. BUREAU OF MINES

American Smelting & Refining Co., 130 Broadway, New York 5, N. Y. Goldsmith Bros. Smelting & Refining Co., 1300 W. 59th Street, Chicago American Sheritang & Refining Co., 1300 W. Spin Direct, Coldenith Bros. Smelting & Refining Co., 1300 W. Spin Direct, Coldenith Bros. Smelting & Refining Co., 1345 E. 97th Street, Cleveland 6, Ohio Intercontinental Metal Corp., 697 Pifth Avenue, New York 17, N. Y. McGean Chemical Co., 1946 Midland Building, Cleveland 15, Ohio Metal & Thermit Corp., 169 E. 42nd Street, New York 17, N. Y. Mctal Traders, Inc., 67 Wall Street, New York 5, N. Y. National Lead Co., 111 Broadway, New York 6, N. Y. Philipp Brothers, Inc., 79 Pins Street, New York 1, N. Y. South American Mineral & Merchandising Corp., 445 Park Avenue, New York 23, N. Y. C. Tennant, Sons & Co., 160 Park Avenue, New York 17, N. Y. York 23, N. Y. C. Tennant, Sons & Co., 189 Park Avenue, New York 17, N. Y. Nathan Trotter & Co., 36 North Front Street, Philadelphia 6, Pa. U. S. Smelting Refining & Mining Co., 75 Federal Street, Boston 6, Mas Watson Geach & Co., 25 Broadway, New York 4, N. Y.

ASSISTOS

American Brake Shoe Co., American Brakeblok Division, 4666 Merritt Avs., Detroit 9, Mich.

American Hair & Felt Co., 1828 Merchandise Mart, Chicage 54, III.

Armstrong Cork Co., 1919 Concord St., Lancasber, Pa., Ashectos Corp., of American, 99 West St., New York, N. Y.

Ashectos Textile Co., Inc., 226 N. LaSalle St., Chicage 1, III.

Atlantic Ashectos Corp., 128 West Chester Ave., Bronx 61, N. Y.

Atlas Ashectos Co., 589 Mitchell St., North Wales, Pa.

Carolina Ashectos Co., Davidson, N. C.

The Calciex Corp., 129 S. LaSalle St., Chicage 3, III.

Commercial Solvents Corp., Agnew, Calif.

Crano Packing Co., 1816 Cuyler Ave., Chicage 3, III.

Detroit Gasket & Mfg. Co., 13449 Burt Rd., Detroit 23, Mich.

R. J. Dorn Co., Inc., 5566 Tchoupitoulas St., New Orleans 15, La.

Eagle-Picher Co., All R. C.A Bidg., New York, N. Y.

The Garlock Packing Co., 256 Main St., Palmyra, N. Y.

General Motors Corp., Inland Mfg., Division, 2727 Inland Ave., Dayton,

Ohio. General Motors Corp., management of the Corp., the Corp Raybestos-Manhattan, Int., Raybestos Div., 946 Rayman St., Bridgeport 2. Conn.

Ropablic Filters inc., 204 21st Ave., Paterson, N. J.

Rastone Corp., 136 S. Earle Ave., Lafayette, Ind.

Rabsroid Co., 506 Fifth Ave., New York 18, N. Y.

F. E. Schundler & Co., Inc., 504 Railroad St., Joliet, Ill.

Smith & Kanzier Corp., Linden, N. J.

Standard Asbestos Mfg. Co., 860 Evergreen Ave., Chicago, Ill.

Stander Brake Lining Co., P. O. Box 93, 2761 Clinton Ave., Houston

1, Tex.

Union Asbestos & Rubber Co., 322 S. Michigan Ave., Chicago, Ill.

U. S. Gypsum Co., 369 West Adams St., Chicago 6, Ill.

U. S. Rubber Co., Textile Dept., 1220 Sixth Ave., New York 20, N. Y.

Victor Mfg. & Gasket Co., 5752 Roosevelt Rd., Chicago, Ill.

BARITE GRINDERS

(Possible Buyers of Crude Barite) Acme Barite Co., Minoral Point, Mo. Arisona Barite Co., Box 928, Mess, Ariz. Barium Products, Ltd., Box 8-A, Newark, Calif. Baroid Salsa Division, National Lead Co., P. G. Box 1675, Houston 1, Texas
The Glidden Co., Chemical & Pigment Division, 786 58th Ave., Oak-land I, Calif.
Industrial Minerals & Chemical Co., Sixth and Gilman Sts., Berkeley, Calif. Calif.
Industrial Minerals, Inc., York, S. C.
Industrial Minerals Co., 2852 East Olympic Bivd., Los Angeles 23, Calif.
Magnet Cove Barium Corp., P. O. Box 8594, Heuston 8, Texas.
Mobar Corp., Mineral Point, Mo.
Mudrits Chemical Corp., P. O. Box 8590, Hatch, N. M.
P. E. Schundler & Co., Inc., 594 Enliroad St., Joliet, Ill.
J. R. Simplet Ca., Boise, Idaho
L. A. Wood, Box 73, Sweetwater, Tenn. (Makes crushed barite only.)

(Possible Suyers of Crushed or Ground Barite for Use in Glass)

Anchor-Hocking Glass Co., 109 N. Broad St., Lancaster, Ohio. Ball Bres., Ryan and Burt Sts., Muncie., Ind. Brockway Glass Co., Brockway, Pa. Buck Glass Co., Fert and Silica Sts., Baltimore, Md. Commercial Glass Co., Fairmont, W. Va. Diamond Glass Co., Royersford, Pa. Foster-Forbes Glass Co., Marion, Ind. Glenshaw Glass Co., Glenshaw, Pa. Hasel-Atlas Glass Co., 1942 Danneburg St., Wheeling, W. Va. A. H. Kerr & Co., Sand Springs, Okla. Latchford-Marble Glass Co., P. O. Box 4707, Los Angeles, Calif. Owens-Illinois Glass Co., Dragles Bidg., Toledo, Ohio. Owens-Illinois-Pacific Coast Co., 135 Stockton St., San Francisco, Calif. Sterling Glass Co., Eapel, Ind. Thatcher Manufacturing Co., Elmira, N. Y. Vitro-Agate Co., Parkersburg, W. Va.

(Possible Buyers of Ground Barite for Use in Paint)

(Possible Buyers of Ground Barite for Uso in Paint)
Amalgamated Paint Co., Inc., Pier 11, North River, New York, N. Y.
Armstrong Cork Co. 1010 Concord St., Lancaster, Pa.
Atlantic Paint & Varnish Works, Wilmington, N. C.
Baker Paint & Varnish Co., 224 Suydam Ave., Jersey City, N. J.
E. B. Browning Co., 1515 Third St., San Francisco, Calif.
C. E. Butler Co., 2368 Hanna St., Oakland S, Calif.
Chilton Paint Ca., 10 15th Ave., College Point, N. Y.
Clement Coverall Co., 615 Van Hook St., Camden, N. J.
Durable Paint Co., 373 Hamilton Ave., Brooklyn, N. Y.
Fisher Thorsen & Co., Inc., 2100 N. W. 22nd Ave., Portland 10, Ore.
Ford Motor Co., Dearborn, Mich.
W. P. Fuller & Co., 301 Mission St., San Francisco, Calif.
General Paint Corp., 2827 Army St., San Francisco, 15, Calif.
U. S. Gypsum Co., 300 W. Adams St., Chicago, Ill.
U. S. Kalsomine Co., 36 Church St., New York, N. Y.
Wesco Waterpaints, Fifth and Grayson Sts., Berkeley 2, Calif.

(Possible Buyers of Crude Barite for Use in Barium Chemicals)

Barium Products Ltd., Newark, Calif.
Barium Reduction Corp., Drawer 1, South Charleston, W. Va.
Chemical Products, Cartersville, Ga.
E. I. du Pont de Nemours & Co., Du Pont Bidg., Wilmington 98, Del.
Mallinckrodt Chemical Works, St. Louis, Mo.
National Lead Co., Titanium Div., 111 Broadway, New York, N. Y.

BENTONITE

American Colloid Co., Merchandise Mart Plaza, Chicago \$4, Ill.
Barold Salea Div., National Lead Co., P.O. Box 1675, Houston 1, Tex.
Benton Clay Co., P.O. Box 432, Casper, Wyo.
Commercial Minerais Co., 316 Irwin St., San Francisco, Calif.
Eastern Clay Products, International Minerals and Chemical Corp., 26
N. Wacker Dr., Chicago 6, Ill.
Eastern Wyoming Bentonite Co., Moorcraft, Wyo.
Harshaw Chemical Co., 47 Ann St., New York 7, N. Y.
Industrial Minerals and Chemical Co., 336 Gilman St., Berkeley, Calif.
Phillip Bros. Chemicals, Inc., 37 Wall Street, New York 5, N. Y.
Ranger Chemical Corp., P. O. Box 1765, Houston 1, Tex.
The Texas Co., Box 2332, Houston 1, Tex.
Western Clay and Metals Co., 1 So. 2nd St., Alhambra, Calif.

REBYLLIUM

Beryllium Corp., P. O. Box 1462, Reading, Pa.
Beryl Ores Co., P. O. Box 409, Route I, Arvada, Colo.
Brash Beryllium Co., 4301 Perkins Ave., Cleveland 3, Ohio.
Derby and Co., Inc., 285 Madison Ave., New York 17, N. Y.
Poote Mineral Co., 18 W. Chelten Ave., Philadelphia 44, Pa.
Metallurg, Inc., 140 Park Ave., New York 17, N. Y.
Phillip Bros., Inc., 70 Pine St., New York 5, N. Y.
Prank Samuel and Co., Inc., Lincoln Liberty Bidg., Philadelphia 7, Pa.
A. O. Smith Corp., 3533 N. 27th St., Milwaukee 16, Wisc.

Note: Domestic beryl is also purchased at Government buying depots at Custer, S. Dak., Franklin, N. H., and Spruce Pine, N. C.

MISMUTH (Metal)

American Smelting and Refining Co., 126 Broadway, New York 5, N. Y. J. T. Baker Chemical Co., Phillipsburg, N. J. Belmont Smelting & Refining Works, Inc., 330 Belmont Ave., Brooklyn, N. Y. Cerro de Pasco Copper Corp., 40 Wall Street, New York 5, N. Y. Mallinckrodt Chemical Works, 2nd & Mallinckrodt Streets, St. Louis 7, Mo. Merck & Co., Inc., Rahway, N. J. National Lead Co., 111 Broadway, New York 6, N. Y. Norwich Pharmacal Co., 17 Eaton Avenue, Norwich, N. Y. Charles Pfaser & Co., Inc., 11 Bartlett Street, Brooklyn 6, N. Y. U. S. Metals Refining Co., 61 Broadway, New York 6, N. Y.

CADMIUM

CADMUM

American Smelting and Refining Co., 129 Broadway, New York 5, N. Y. American Zine, Lead and Smelting Co., 1609 Paul Brown Bidg., St. Louis, Mo. Anaconda Copper Mining Co., 25 Broadway, New York, N. Y. Arkansas Metals Co., P. O. Box 245, Jonesboro, Arkansas. Belmont Smelting and Refining Works, Inc., 339 Belmont Ave., Brooklyn, N. Y. Chemical and Pigment Co. (Div. of the Glidden Co.), 2701 Broening Highway, Baltimore 22, Maryland.

Ragle Picher Co., (Mining and Smelting Div.), P. O. Bex 910, Miami, Okla.

Harshaw Chemical Co., 1945 E. 97th St., Cleveland 6, Ohio. International Minerals and Metals Corp., 11 Broadway, New York 6, N. Y.

St. Joseph Load Co., 250 Park Avenue, New York 17, N. Y. Sullivan Mining Co., Kellogg, Idaho.

International Smelting and Refining Co., International, Utah.

CHROME ORE

(Metallurgical Ore Users & Selling Agents)

Electro-Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y. Godoy Co., 25 Broadway, New York 4, N. Y. Montana Ferro-Alloy Co., Memphis, Tenn. Ohie Ferro-Alloy Corp., Canton 2, Ohio Pittsburgh Metallurgical Co., Niagara Falls, N. Y. Rustless Iron & Steel Division of the Armeo Steel Corp., 3400 E. Chase St., Baltimore 13, Md. Vanadium Corporation of America, 420 Lexington Ave., New York 17, N. Y.

(Refractory Ore Users & Selling Agents)

Ratic Refractory Ore Users & Salling Agents)

Basic Refractories, Inc., 345 Hanna Bidg., Cleveland 15, Ohio.

Bradley & Ekstrom, 326 Market St., San Francisco, Calif.

Botfield Refractories Co., 777 S. Swanson St., Philadelphia 47, Pa.,

Foote Mineral Co., Inc., 18 W. Chelten Ava., Philadelphia 44, Pa.,

Godoy Co., 25 Broadway, New York 4, N. V.

General Refractories Co., 1529 Locust St., Philadelphia 7, Pa.,

Harbison-Walker Refractories Co., Farmers Blank Bidg., Pittsburgh 23,

Exiser Alum & Chem. Corm., 1924 Broadway, Oakland, Calif.

Fa.

Kaiser Alum & Chem. Corp., 1924 Broadway, Oakland, Calif.
B. J. Lavino & Co., 1528 Walnut St., Philadelphia 2, Pa.
U. S. Steel Co., 525 Wm. Penn Place, Pittsburgh, Pa.

COBALT

Ceramic Color & Chemical Mfg. Co., New Brighton, Pa. Foote Mineral Co., 18 W. Chelten Ave., Philadelphia 44, Pa. Harshaw Chemical Co., 1945 East 97th St., Claveland, Ohio. Kennametal, Inc., Latrobe, Pa., The Pyrites Co., Wilmington, Del. The O. Hommel Co., Carnegie, Pa. Shepherd Chemical Co., Highland Avenue, Cincinnati, Ohio.

American Metal Co., Ltd., Carteret, N. J.
American Smelting & Refining Co., El Paso, Tex, Garfield, Utah, Hayden, Ariz., Tacoma, Wash.
Anaconda Copper Mining Co., Anaconda, Mont.
Inspiration Consolidated Copper Co., Inspiration, Ariz.
International Smelting & Refining Co., Miami, Ariz., Tooele, Utah
Kennecott Copper Corp., McGill, Nev., Hurley, N. M.
Magma Cooper Co., Superior, Ariz.
Phelps Dodge Refining Corp. Laurel Hill, N. Y.
Phelps Dodge Refining Corp. Laurel Hill, N. Y.
C. Tennant Sons & Co., Empire State Bidg., New York 1, N. Y.
Tennessee Copper Co., Copperhill, Tenn.

COLUMBITE-YANTALITE

Electro Metallurgical Division of Union Carbide and Carbon Corp., 30
E. 42nd St., New York 17, N. Y.
Fansteel Metallurgical Corp., N. Chicago, Ill.
Foote Mineral Co., 18 W. Chelten Ave., Philadelphia 44, Pa.
Kennametal, Inc. Latrobe, Fa.
Metal Hydrides, Inc., 12-24 Congress St., Beverly, Mass.
Note: Columbite-tantalite is also purchased at Government buying
depots at Custer, S. Dak., Franklin, N. H., and Spruce Fine,
N. C.

DIATOMITE

DIATOMITI

American Cyanamid Co., 38 Rockefeller Plaza, New York, N. Y.
A. Daigger & Co., 161 West Kinzie St., Chicago, Ill.
General Refractories Co., 1518 Locust St., Philadelphia, Pa.
B. F. Geodrich Co., 449 B. Main St., Akron, Ohlo.
Hygeis Filter Co., 3422 Denton St., Detroit.
Industrial Minerals & Chemical Co., 336-38 Gilman St., Berkeley, Calif.
Marshail Dill Division, WhitCo Chemical Co., 30 Buxome St., San Francisco, Calif.
Miller Products Co., 1932 S W Water Avo., Portland, Orc.
Minerals & Insulation Co., Inc., 240 Webster St., Trenton 4, N. J.
National Battery Co., First Nat'l Bank Bidg., St. Paul, Minn.
National Filter Media Co., Sales Div. of Filter Media Corp., 1719 Dixwell Avo., New Haven, Conn.

GRINDERS OF FELDSPAR

Abingdon Potteries, Inc., 801 West Main St., Abingdon, Ill. Bell Minerals Co., West Paris, Me. Carolina Mineral Co., Inc., Erwin, Tenn. Clinchfield Sand and Feldspar Corp., 413 Washington Ave., Towson 4, Clinchfield Sand and Feldspar Corp., 413 Wannington Ave., Md.

Md.

Consolidated Feldspar Dopt. of International Minerals and Chemical Corp., Erwin, Ten.,
Descenderf Marble Co., P. O. Box 121, Austin, Tex.
Dominion Minerals, Inc., Pluey River, Va.
Eureka Flint and Spar Co., Inc., 196 W. State St., Trenton, N. J.
Feldspar Flotation Corp., Spruce Pine, N. C.
Standard Flint and Spar Corp., 1461 New York Ave., Trenton, N. J.
Western Feldspar Milling Co., Box 671, Salida, Kansas
Worth Spar Co., P. O. Box 743, Middletown, Conn.

FLUORSPAR

(Brokers or Selling Agents)

(Brokers or Selling Agents)

Balfour, Guthrie, & Co., Los Angeles, Calif.

Bauer-Wilson & Bateman, 138 S. LaSalle St., Chicago, Ill.
Continental Ore Co., 560 Fifth Ave., New York City.
E. I. du Pont de Nemours & Co., 1697 Market St., Wilmington, Del.
Foote Mineral Co., 18 W. Chelten Ave., Philadelphia 44, Pa.
Hickman, Williams & Co., Clark Bidg., Pittsburgh, Pa.
Kerchner, Marshall & Co., Oliver Bidg., Pittsburgh, Pa.
E. J. Lavine & Co., 1528 Walnut St., Philadelphia, Pa.
Mercantile Import & Expert Corp., 21 East 40th St., New York City.
Miller-Adick Co., Carew Tower, Cincinnati, O.
Wm. H. Muller & Co., Inc., 122 East 42nd St., New York City.
Oglebay Norton & Co., Hanna Bidg., Cleveland, O.
Frank Samuel & Co., Lincoln-Liberty Bidg., Philadelphia, Pa.

GERMANIUM

American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.

The American Steel and Wire Div. United States Steel Corp., Rocke-feller Bldg., Cleveland 13, Ohio.

American Zinc, Lead and Smelting Co., Paul Brown Building, St. Louis, Missouri

Eagle Picher Co., Mining and Smelting Div., First Nat. Bank Bldg., Miami, Okla.

Matthlesson and Hegler Zinc Co., 9th and Sterling Sts., La Salle, Ill.

Asbury Graphite Mills, Asbury, N. J. Hill and Griffith Co., Cincinnati, O. Pacific Graphite Works, Oakland, Cal. Ray-O-Vac Co., Madison, Wis.

IRON ORE

IRON ORE

Alan Wood Steel Co., Conshohocken, Pa.
Armeo Steel Carp., Middleton, Ohio.
Barium Steel Carp., 25 Broad St., N. Y., N. Y.
Bethlehem Steel Company, Bethlehem, Pa.
Colorade Fuel & Iron Corp., Pueblo, Colorado.
Crucible Steel Co. of America, 495 Lexington Ave., New York, N. Y.
Detroit Steel Co., P. Portsmouth, Ohio
Eastern Gas and Feel Associate Kaiser Steel Corp., 250 Stewart Bidg.,
Boston, Mass.
Ford Motor Company, Detroit, Mich.
Godoy Co., 25 Broadway, New York 4, N. Y.
Granite City Steel Co., Box 287, Granite City, Ill.
Hanna Farnace Corp., Grant Bidg., Chicago 3, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Interlake Iron Corp., 1990 Union Commerce Bidg., Claveland 14, Chie.
International Harvester Co., 189 No. Michigan Ave., Chicago 1, Ill.
Jones & Laughlin Steel Corp., 37d Ave. and Ross St., Pittsburgh 36, Pa.
Kaiser Company, Inc., Fontana, Calif.
Lone Sta Steel, Co., Lone Star, Texas.
National Steel Corp., 2890 Grant Bidg., Pittsburgh, Pa.
National Steel Corp., Newport, Kentacky.
Pittsburgh Coke and Chemical Co., 1892 Grant Ave., Pittsburgh, Pa.
Pittsburgh Steel Corp., Republic Bidg., 25 Prospect Ave., N. W. Cleveland 1, Ill.
In Ohio Steel Corp., Sharon, Pa.
Sloos-Sheffield Steel & Iron div., United Pipe & Foundry Corp., Birmingham, Ala.
Tennessee Coal Steel Corp., Wheeling, West Virginia.
Woedward Iron Company, Woodward, Ala.
Voungstown Sheet & Tube Co., Btambaugh Bidg., Youngstown 1, Ohio

LEAD

American Metal Company, Ltd., 51 Broadway, New York 5, N. Y. American Smelting & Refining Co., 126 Broadway, New York 5, N. Y. Bunker Hill & Sullivan Mining & Concentrating Co., Rellogg, Idaho. the Consolidated Mining & Smelting Co., Ltd., Montreal, Canada. Eagle Picher Co., Mining and Smelting Div., P. O. Box 910, Miami, Ohio. Ohio.

International Smolting & Refining Co., 25 Broadway, New York 4, N. Y. Metal Traders, Inc., 47 Wall St., New York, N. Y. National Lead Company, 111 Broadway, New York, N. Y. Philipp Brothers, Inc., 70 Pine St., New York, S. Y. Y. Lead, Lead Co., 256 Park Ave., New York 5 N. Y. C. Tennant, Sons & Co., Empire State Bidg., New York I, N. Y. United States Smelting Refining & Mining Co., 75 Federal St., Boston, Mass.

LEPIDOLITE

Corning Glass Works, Corning, N. Y. General Electric Co., Nela Park, Cleveland, Ohio. Peote Mineral Co., 18 W. Chelten St., Philadelphia 44, Pa. Pittsburgh Corning Corp., Port Allegany, Pa.

MAGNESITE AND BRUCITE

Basic Refractories, Inc., 845 Hanna Bldg., Cleveland 15, Ohio.
Raiser Aluminum & Chemical Corp., Kaiser Bidg., Oakland 12. Calif.
Northwest Magnesite Co., 1896 Farmers Bank Bldg., Pittsburgh 22, Po.
Standard Slag Co., Gabbs, Nev.
Westvaco Chroline Products Corp., 495 Lexington Ave., New York 17,
N. Y.

MANGANESE ORE

(Consumers of Metallurgical-grade Manganese Ore)

(Consumers of Metallurgical-grade Manganese Ore)
Bothlehem Steel Ca., Bethlehem, Pa.,
Buckeye Steel Castinga, 2211 Sa., Parsons Ava., Columbus 7, Ohio,
Colorado Fuel and Iron Corp., Paeblo, Colorado
Columbia-Geneva Steel Div., U. S. Steel Corp., P. O. Box 289, Salt Lake
City 19, Utah.
Electro Manganese Corp., Knoxville, Tennessee.
Electro Metallurgical Co., A Division of Union Carbide and Carbon
Corp., 96 E. 42nd St., New York 17, N. Y.
E. J. Lavino and Co., 1528 Walnut St., Philadelphia 2, Pa.
Gedoy Co., 25 Broadway, New York 4, N. Y.
Lincoin Electric Co., 12818 Colt Road, Cleveland, Ohio.
National Paint and Manganese Co., Lynchburg, Virginia.
Ohio Ferro-Alloya Corp., 100 Citizens Bidg., Canton, Ohio.
Pittaburgh Metallurgical Co., Nagara Falls, New York.
Sheffield Steel Corp., Kansas City, Mo.,
Nashville, Tennessee.
Tenn-Tex Alloy and Chemical Corp., American National Bank
Bidg., Nashville 3, Tenn.
United States Steel Co., 525 William Ponn Place, Pittaburgh 38, Pa.

(Consumers of Battery and Chemical-grade Manganese Ores) Acme Battery Co., 10 Pearl St., Brooklyn, N. Y. Anchor Hocking Glass Corp., 469 N. Broad St., Lancaster, Ohio Arcrods, Inc., P. O. Box 4686, Sparrows Point, Ind. Burgeas Battery Company, Fresport, III.

Foote Mineral Co., 10 E. Chelten Ave., Philadelphia 44, Pa. General Dry Batteries, Inc., Cleveland, Ohio. General Electric Co., Mela Park, Cleveland, Ohio Winchester Repeating Arms Co., New Haven 4, Conn.

MERCURY

Allied Chemical & Dye Corp., The Solvay Process Div., P. O. Box 271, Syracuse, N. Y.
American Cyanamid Co., General Explosives Div., 20 Rockefeller Plasa, New York 20, N. Y.
American Meter Co., Erie, Pa.
Automatic Steel Products, Inc., Mercury Clutch Div., 1201 Camden Ave., S. W., Canton 6, Ohio.
Balley Meter Co., 1052 I vanhoe Rd., Cleveland 10, Ohio.
J. T. Baker Chemical Co., Phillipsburg, N. J.
F. W. Berk & Ce., Inc., Woodridge Div., Box 38, Woodridge, N. J.; Coast Chem. Div., 55 New Montgomery St. San Francisco, Cal.
L. D. Caulk, Milford, Del.
E. I. du Pont de Nenaours & Co., Inc., Methods Div., Du Pont Bidg.,
Wilmington 93, Del.
Fexboro Co., Fexboro, Mass.
General Aniline & Film Corp., General Aniline Works Div., 435 Hudson
St., New York 14, N. Y.
General Color Co., 24 Avenue B, Newark 5, N. J.
General Electric Co., Purchasing Dept., 1 River Road, Scheneciady 5, N. Y.
Mallinckrodt Chemical Works, Jersey City 5, N. J.

General Electric Co., Purchasing Dept., 1 River Road, Schenectady 5, N. Y.
Mallinckredt Chemical Works, Jersey City 5, N. J.
Mathieson Chemical Corp., Mathiesen Bidg., Baltimore 3, Md.
Merck & Co., Inc., Lincola Ave., Rahway, N. J.
The Mercoid Corp., 4201 Belmont Ave., Chicago 41, Ill.
Metabalis Corp., 209 Wagaraw Rd., Hawthorne, N. J.
Minneapolis Honeywell Regulator Co., 2753 4th Ave. S., Minneapolis 8,
Minn.; Brown Instrument Div., 4331 Wayne Ave., Philadelphia, Pa.
Nepera Chemical Co., Inc., Yonkers 2, N. Y.
Phillips Petroleum Co., Bartlesville, Ohla.
Public Service Electric & Gas Co., Electric Dept., 89 Park Place,
Newark 1, N. J.
Quickellver Producers Association, 407 Sansome St., San Francisco 11.
Calif.
Thomas A. Edison, Inc., Primary Battery Div., Bloomfield, N. J.
Union Carbide & Carbon Corp., 30 E. 42nd St., New York, N. Y.
U. S. Vanadium Corp., Niscet Chemicals Div., Bas. 307 Niagara Falls,
N. Y.
Westinghouse Electric Corp., 306 Fourth Ave., Pittchway, A. N.

U. B. Vanadiam Corp., Alsoet Chemical Viv., N. Y.
Westinghouse Electric Corp., 896 Fourth Ave., Pittaburgh 30, N. J.
Wyandotte Chemical Corp., Wyandotte, Mich.

MICA

American Mica Insulation Co., Frelinghuysen Ave., Newark, N. J.

American Mica Products Co., 17 East 48th Bt., New York 17, N. Y.

Asheville Mica Co., Box 318, Newport News, Va.

Ford Radio & Mica Curp., 548 63rd St., Brooklyn, N. Y.

General Electric Co., 1 River Rd., Behenectady 5, N. Y.

Huse-Libery Mica Co., 177 Camden St., Boston, Mars.,

Industrial Mica Corp., 948 61st St., Brooklyn, N. Y.

Mica Fabricating Co., 53 Central Ave., Rochelle Park, N. J.

Mica Insulator Co., Schenectady 1, N. Y.

Perfection Mica Co., 30 North Wacker Drive, Chicago, Ill.

Rellance Mica Co., 341 39th St., Brooklyn, N. Y.

Spruce Pine Mica Inc., Spruce Pine, N. C.

Western Electric Co., Inc., Hawthorne Works, 195 Broadway, New York

7, N. Y.

MICA GRINDERS

(Buyers of Domestic Scrap Mica)

Asheville Mica Ca., Biltomore. N. C.-Dry
Buckeye Mica Mills, Box 418, Buckeye, Aris.
Concord Mica Corp., 35 Chestnut St., Penacoek, N. H.-Wet
Franklin Mineral Producta Co., Franklin, N. C.-Wet and Dry
Richmend Mica Corp., 399 Jefferson Ave., Newport News, Va.-Wet
Southern Mica Co., Johnson City, Tenn.
Thempson-Weinman, Cartersville, Ga.-Dry
Western Mica Co., Fort Worth, Texas.
Western Nonmetallies, Inc., Pueble, Colo.-Dry

MOLYBDENUM CONCENTRATES

J. T. Baker Chemical Co., Phillipsburg, N. J.
Electre Metaliurgical Div., Niagara Falls, N. Y.
Climax Molybdenum Co., 500 Pifth Ave., New York, N. Y.
Molybdenum Corp. of America, 500 Pifth Ave., New York, N. Y.
Republic Steel Corp., Canton, Ohio
S. W. Shattuck Chemical Co., Denver, Colo.

NICKEL

American Smelting & Refining Co., 120 Broadway, New York, N. Y. Cosmo Metal Allays Co., 275 Front St., New York, N. Y. Sulmet Alloys Co., Inc., Wellington St. and Eric R.R., Clifton, N. J. United States Smelting Refining & Mining Co., 1 State St., Boston, Mass.

PERLITE

American Bildrok Co., 2001 West Pershing Road, Chicago 9, Ill.
American Perlite Corp., 28th & B Streets, Yard 2, Richmond, Calif.
Atlantic Perlite Co., 1919 Kenilworth Ave., Washington 19, D. C.
Buffale Perlite Co., 1908 Sugg Road (Cheektowaga), Buffalo 21, N. Y.
Carolina Perlite Co., Inc., P. O. Box 158, Saliobary, N. C.
The Cleveland Gypsum Co., 1278 West Third Street, Cleveland, O.
Coast Perlite Corp., 656 S. Clarence St., Los Angeles 23, Calif.
Combined Métals Reduction Co., Panacalite Div., 218 Felt Bidg., Salt
Lake City. Utah.
Dant & Russell, Inc., Dantore Products Div., 711 Equitable Bidg., Portland 4, Orc.
Great Lakes Carbon Corp., Perlite Div., 18 E. 48th St., New York 17,
N. Y.

Great Lakes Carbon Corp., Perlite Div., 18 E. 48th St., New York N. Y.
Gregg Products Co., 528 Bridge St., N. W., Grand Rapids 4, Mich. Midwestern Perlite Corp., P. O. Box 758, Oklahoma City, Okla.
Minorale Processing Corp., 520 Van Rensselaer St., Syracuse, N. Y.
Minnesota Perlite Corp., 215 W 86th St., Minnespolis 20, Minn.
Osark-Mahoning Co., Osark Chem. Div., Tulas, Okla.
Paramount Perlite Co., 16236 S. Illinois St., Paramount, Calif.
Pennsylvania Perlite Corp., P. O. Box 694, Allentown, Penn.
Peerless Perlite Co., 2807 So. Pairfax Ave., Los Angeles 16, Calif.

Perlite, Inc., 634 N. Third West, Salt Lake City 3, Utah.
Perlite of Houston, Inc., P. O. Box 14024, Houston, Texas.
Perlite industries, Inc., P. O. Box 11, Terminal, Texas.
Perlite Industries of Arizona, 2123 E. Hershaw Rd., Phoenix, Arix.
Perlite Products, Inc., Primos, Penn.
Perlite Products, Inc., Primos, Penn.
Perlite Products Corp., Box 695, Dallas, Texas.
Precast Slab & Tile Co., Inc., 1367 S. Kingshighway Blvd., St. Louis
10, Mo.
Tennessee Products and Chem. Corp., American Ntl. Bank Bldg., Nashville 3, Tenn.
Texas Perlite Corp., 2611 N. Sylvania St., Fort Worth, Texas.
Sno-Lite Products Co., P. O. Box 58, Reno, Nev.
United States Gypsum Co., 390 W. Adams St., Chicago 6, Ill.
United States Perlite Co., 609 S. Grand Ave., Loc Angeles 14, Calif.

PLATINUM

The American Platinum Works, 225 New Jersey R. R. Ave., Newark 5, N. J.

Baker & Co., Inc., 113 Astor St., Newark 5, N. J.

J. Bishop & Co. Platinum Works, Malvarn, Pa.

Sigmund Cohn & Co., 44 Gold St., New York 7, N. Y.

Goldsmith Bros. Smelting & Refining Co., 58 E. Washington St., Chicago 36, Ill.

Handy & Harman, 32 Fulton St., New York 7, N. Y.

Irvington Smelting & Refining Works, 374 Nye Ave., Irvington 11, N. J.

Johnson, Matthey & Co., Inc., 698 Fifth Ave., New York 20, N. Y.

Asstennuber & Lehrefeld, Isc., 21 West 46th St., New York 19, N. Y.

Montana Assay Office, 619 S.W. 2nd Ave., Portland 4, Ore.

J. A. Samuel & Co., 229 Broadway, New York 7, N. Y.

Wildberg Bros. Smelting & Refining Co., 742 Market St., San Francisco 2, Calif.

Western Gold & Platinum Works, 589 Bryant St., San Francisco 7, Calif.

PYRITE

American Smelting & Refining Co., 128 Broadway, New York 5, N. Y. Anaconda Copper Mining Co., 25 Broadway, New York 4, N. Y. Baugh Chemical Company, Baltimore, Maryland.
Davidson Chemical Corporation, 28 Hopkins Place, Baltimore 3, Maryland.
Poote Mineral Company, 18 West Chelten Ave., Philadelphia 44, Pa. General Chemical Division, Allied Chemical & Dye Corp., P. O. Box 4040, Denver, Colorado.
Reliance Phosphate Company, Savannah, Georgia.
Stauffer Chemical Company, 636 California St., San Francisco S, Calif.

RARE-EARTH ORES

(Cerium ores, monazite sand, bastnaesite, other thorlum-bearing ores)

Lindsay Light & Chemical Co., West Chicago, Illinois.
Mailinckrodt Chemical Works, 2nd and Mallinckrodt Sts., St. Louis 7,
Ms.
Maywood Chemical Works, Maywood, N. J.
Minerals Refining Co., Murray, Utah.
Rare Earths, Inc., R. D. #1, Paterson, N. J.

SPODUMENE

Corning Glass Works, Corning, N. Y.
Foote Mineral Co., 18 E. Chelten Ave., Philadelphia 44, Pa.
Maywood Chemical Works, Maywood, N. J.
Metalloy Corp., 1329 Rand Tower, Minneapolis, Minn.
National Enameling and Stamping Co., 276 N. 12th St., Milwaukee, Wis.
Owens Corning Fiberglas Corp., Newark, Ohio.

STRONTIUM ORES

STRONTIUM ORES

Associated Metals & Minerals Corp., 40 Rector St., New York, N. Y.
J. T. Baker Chemical Co., Phillipsburg, N. J.
Harium Products, Ltd., Modesto, Calif.
Barium Reduction Corp., Charleston, W. Va.
E. I. du Pont de Nemours & Co., Inc., 11th & Orange Sts., Wilmington, Del.
Foste Mineral Co., Inc., 12 E. Chelten Ave., Philadelphia, Pa.
(minerals).
General Electric Co., 1 River Road, Schenectady, N. Y.
Chao. Hardy, 415 Lexington Ave., New York, N. Y.
Harshaw Chemical Co., 1933 E. 97th St., Cleveland, Ohio.
Hummel Chemical Co., 99 West St., New York, N. Y.
Jungman & Co., 157 Chambers St., New York, N. Y.
J. A. Samuel & Co., 220 Broadway, New York, N. Y.

TALC

Arkansas Talc Co., Inc., Bryant, Ark. Industrial Minerals and Chemicals Co., 836 Gilman St., Berkeley, Calif. Stauffer Chemical Co., Box 68, North Portland, Ore.

TANTALITE (SEE COLUMBITE)

American Smelting and Refining Co., 120 Broadway, New York S, N. Y. Metal & Thermit Corp., 120 Broadway, New York S, N. Y. Reconstruction Finance Corp., Office of Metala Reserve, 811 Vermont Ave., Washington 25, D. C. C. Tennant, Sons & Co., Empire State Bldg., New York 1, N. Y. Vulcan Detinning Co., Sewaren, N. J.

TITANIUM MINERALS (limenite-Pigment Manufacturers)

American Cyanamid Co., Ca'eo Chemical Div., Eastern Turnpike, Bound Brook, N. J.
The Chemical & Pigment Co., 6401 St. Helena Ave., Baltimore 22, Md.
E. I. du Pont de Nemours & Co., Inc., Methods Div., Du Pont Bldg.,
Wilmangton 36, Del.
National Lead Co., 111 Broadway, New York 6, N. Y.

(Ilmenite & Rutile-Welding Rod Manufacturers)

(limenite & Rutile—Welding Rod Manufacturers)

Actare, Inc., P. O. Box 168, Bedford, Ohio.
Alioy Rods Company, P. O. Box 788, York, Pa.
American Brake Shoe Co., 220 Park Ave., New York 17, N. Y.
Arcos Corp., 1500 86. 50th St., Philadelphia 43, Pa.
Arcrods Corp., 60 E. 42nd St., New York 17, N. Y.
Champion Rivet Co., 10931 Harvard Ave., Cleveland 15, Ohio.
Harnischfeger Corp., 4400 W. National St., Milwaukee, Wis.
Hobert Brothers Co., 1213 Hobert Road, Troy, Ohio.
Holiup Corp., 4700 W. 19th St., Chicago, Ill.
R. G. Le Tourneau, Inc., Peoria, Ill.
R. G. Le Tourneau, Inc., Peoria, Ill.
R. G. Le Tourneau, Inc., Peoria, Ill.
Abboer Saise Co., 909 W Weber Ave., Stockton, Cal.
Shober Saise Co., 909 W Weber Ave., Stockton, Cal.
A. O. Smith Corp., 3533 N. 27th St., Milwaukee 1, Wis.
Stoody Co., Whitter, Calif.
Westinghouse Electric Corp., 306 Fourth Ave., Pittsburgh, Pa.
Ceramic Color & Chemical Mfg. Co., 13th St. and Blockhouse Run, New
Brighton, Pa.
National Lead Co., Titanium Alloy Mfg. Div., Box C, Bridge Station,
Niagara Falls, New York.
Metallurg, Inc., 160 Park Ave., New York, N. Y.
Phillip Bros., Inc., 70 Pine St., New York, S. N. Y.
Vitro Mfg. Co., 60 Greenway Drive, Cerliss Station, Pittsburgh 4, Pa.

(Titanium Sponge Producers)

E. I. du Pont de Nemours and Company, DuPont Building, Wilmington 98, Del. Titanium Metals Corp. of America, 60 East 42nd St., N. Y. 17, N. Y. Crane Company, 836 Michigan Ave., Chicago 5, Ill.

TUNGSTEN CONCENTRATES

TUNGSTEN CONCENTRATES

Bishop Concentrate & Cleaning Co., Bishop, Calif.
Braeburn Alloy Steel Co., Div. of Continental Copper & Steel, Inc.,
Braeburn Alloy Steel Co., Div. of Continental Copper & Steel, Inc.,
Braeburn Alloy Steel Co., Chicago Heights, Ill.
Clifford Ach, 2709 Birch St., Alhambra, Calif.
Crucible Steel Co. of America, 405 Lexington Ave., New York, N. Y.
E. Fernstrom, 648 West 3rd St., Tucson, Aris.
Fansteel Metallurgical Corp., 2296 Sheridan Read, North Chicago, Ill.
Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
General Electric Co., Cleveland Wire Works, Lamp Dept., 1331 Chardon Road, Euclid 17, Ohle.
Jessop Steel Co., Washington, Pa.
C. W. Jones, Bishop, Calif.
Kennametal, Inc., Latrobe, Pa.
Molyhdenum Corp. of America, 596 5th Ave., New York, N. Y.
National Hardware and Supply Co., 3618 Ventura Ave., Fresno, Calif.
North Metal and Chemical Co., York, Pa.
Reduction and Refaing Co., Kenilworth, N. J.
Reading Chemical Co., 1895 So., Bannock Street, Denver, Colo.
Simonds Saw and Steel Co., Lockport, N. Y.
Sylvania Electric Products Co., Tongston & Chemical Division, Box 70,
Towands, Pa.
U. S. Vanadium Co., Div. of Union Carbide & Carbon Corp., 30 E. 42nd
St., New York, N. Y.; Bishop, Calif.
Universal Cyclops Steel Corp., Bridgeville, Pa.
Vanadium Alloy Steel Co., Latrobe, Pa.
Vulcan Crucible Steel Co., Latrobe, Pa.
Vulcan Crucible Steel Co., Alquippe, Pa.
Wash Chank Corporation, Woolworth Building, New York 7, N. Y.
Westinghouse Electric Corp., 1-17 MacArthur Ave., Bloomfield, N. J.

URANIUM-VANADIUM ORES

American Smelting and Refining Co., Ore Purchasing Depot, Edgement, S. D. S. D.
Atomic Energy Commission, Ore Purchasing Depot, Monticelle, Utah, or Maryavale, Utah, and Shiprock or Grants, N. M.
Climax Uranium Co., Grand Junction, Colo.
U. S. Vanadium Co., Rifle, Colo, or Uravan, Colo.
Vanadium Corp. of America, Durango, Colo., Naturita, Colo., and Hite, Utah.
Vitro Chemical Co., 600 W. 33rd St., Salt Lake City, Utah.

TINC

The American Metal Co., Ltd., 61 Broadway, New York 6, N. Y. American Smelting & Refining Co., 129 Broadway, New York 5, N. Y. American Zinc Co., of Illinois, 1600 Paul Brown Bidg., 81, Louis, Mo. Anaconda Copper Mining Co., 25 Broadway, New York 4, N. Y. Associated Metals & Minerals Corp., 75 West St., New York 6, N. Y. Athletic Mining & Smelting Co., Fort Smith, Ark. E. I. du Pont de Nemours & Co., 1907 Market St., Wilmington 98, Del. Eagle-Picher Mining & Smelting Co., Mismi, Okle. W. R. Grace & Company, Danville, Ill. International Minerals & Metals Corp., 11 Broadway, New York 4, N. Y. The Hegler Zinc Company, Danville, Ill. International Minerals & Metals Corp., 11 Broadway, New York 4, N. Y. Matthiessen & Hegeler Zinc Co., La Salle, Ill. Metal Traders, Inc., 67 Wall St., New York, N. Y. New Jersey Zinc Co., 160 Front St., New York, N. Y. New Jersey Zinc Co., 160 Front St., New York, N. Y. St. Joseph Lead Co., 250 Park Ave., New York, N. Y. St. Joseph Lead Co., 250 Park Ave., New York 17, N. Y. The Sherwin-Williams Co., Ozark Smelting & Mining Division, 101 Propect Ave., New, Cleveland 1, Ohio.
Sullivan Mining Co., Box 209, Kellogg, Idaho.
C. Tennant, Sons & Co., Empire State Bidg., New York 1, N. Y. U. S. Steel Corp., 436 Seventh Ave., Pittsburgh 39, Pa. United Zinc Smelting Corp., 50 Union Square, New York 3, N. Y.

ZIRCON

F. W. Berk & Co., Woodbridge, N. J.
Berkshire Chemicals, Inc., 420 Lexington Ave., New York 17, N. Y.
Cohart Refractories Co., Louisville, Kentucky.
Electro Metallurgical Div., Union Carbide & Carbon Corp., 30 E. 42nd
St., New York 17, N. Y.
Foote Mineral Co., 18 W. Chelten Ave., Philadelphia 44, Pa.
International Titanium Corp., 120 Broadway, New York 5, N. Y.
Metall & Thermit Corp., 100 E. 42nd St., New York 17, N. Y.
Metalla, Inc., 100 Park Avenue, New York 17, N. Y.
Orefraction, Inc., 7505 Meade St., Pittsburgh, Pa.
Titanium Alloy Mfg., Div. National Lead Co., 111 Broadway, New York
6, N. Y.

Have You Received MINERAL DRESSING NOTES NUMBER 20. "CYANAMID REAGENTS"

This 44 page bulletin is an up-to-date expansion and revision of the data on properties and uses of Cvanamid flotation reagents contained in the 1937 and 1947 editions. Noteworthy developments in the froth flotation field since publication of our last edition include:

Growing application of Cyanamid 800 Series Promoters for treating glass sands, barite, garnet, kyanite, etc.

Growing use of AERO* Promoter 404 as a booster to increase sulphide recovery, and as an oxide promoter.

Introduction of AEROFLOC® Reagents, flocculation, settling and filtration aids for pulps, slimes and effluents from ore and coal preparation plants.

Introduction of Cyanamid's cationic reagent, AEROMINE® 2026 Pro-

The use of AERO* Modifiers 158, 162 as gangue controllers and flotation modifiers.

This revised bulletin contains information on the characteristics and applications of various Cyanamid promoters and frothers; regulating, activating and depressing agents; contains a section on reagent practice for flotation of various metallic ores as well as a section on the flotation of various non-metallic minerals. Included also are sections on reagent feeding, a brief flotation bibliography and condensed tables showing the usage and handling of various flotation reagents, and a listing of many non-metallic minerals and how they can be floated.

AERO is a trade-mark of American Cyanamid Company applied to flotation reagents and other chemicals used in ore beneficiation plants or processes.



MINERAL DRESSING DIVISION 30 ROCKEFELLER PLAZA, NEW YORK 20, NEW YORK OAKLAND, CALIFORNIA EL PASO, TEXAS

BUNKER HILL & SULLIVAN MINING AND CONCENTRATING CO.

Mines and Smelter at Kellogg, Idaho

Buyers of:

Lead ores and concentrates, zinc concentrates, silicious gold ores.

Sellers of:

"BUNKER HILL" brand of refined Pig Lead. Slab Zinc, Cadmium crude Antimonial Lead and Leaded Zinc Oxide.

We are proud of our "BUNKER HILL" trade mark. It represents the highest quality of metals produced. We likewise strive to make "BUNKER HILL" known as a symbol of the highest quality in our relations with our employees, with our suppliers of ores and concentrates, with our stockholders and with the general public.

for information regarding are rates and shipments Address:

> BUNKER HILL SMELTER Box 29 Kellogg, Idaho

MAGMA COPPER COMPANY

Buyers of

COPPER. GOLD

AND SILVER ORES

MINES AND SMELTER AT

SUPERIOR, ARIZONA

AMERICAN ZINC, LEAD SMELTING COMPANY

Buyers of Zinc Concentrates Suitable for Smelting in Retort and Electrolytic Smelting Plants, also Buyers of High Grade Lead Concentrates.

Address Communications to Ore Buying Department

Paul Brown Building ST. LOUIS, MISSOURI

423 Mills Bldg. EL PASO, TEXAS

927 Old National Bank Building
SPOKANE. WASHINGTON

P.O. BOX 577 DUMAS, TEXAS

International Smelting and Refining Co.



Buyers of

Copper, Silver & Gold **Ores and Concentrates:**

Copper Smelter—Miami, Arizona Address: One Purchasing Department International Smelting and Refining Co. P. O. Box 1265

Lead & Zinc Ores and Concentrates

Lead and Lead-Zinc Smelter Lead-Zinc Concentrator

Address: Ore Purchasing Departs

International Smelting and Refining Co.

818 Kearns Building Salt Lake City, Utah

Please establish contact prior to shipment.

DIRECTORY

United States Mining Operations

AT.ASKA

ACE SING CO
Bax 137, Nome
Pres: Albert Erbaha
Vice-Pres: Ciyde Kammos
Ges Mgr: E C Stread
ACE MINE 23 am 8 W of Sa

ADMIRALTY ALASKA GOLD MINING CO Bas kits, Jumins Pres. Henry Raden Gen Mgr. W S Penswich LODE MIRE, Paneer Bay, Chango dist, SE Alaska reg. fu. Ag. Co. Mt. Co Conc Engr. N C Sures 100 - TON GRAV FLOT MELL

ALASKA CUPPER CO

Box 2000, Anchorse

LODE MINE Glacier Cr. Nisine Dist, Cu

ALASKA EMPIRE GOLD MINING CO. Book 529, Juneau Pres. N. C. Sunea VP. Dr. L. P. Duwes Dir. V B. Waitder Gen Mgr. W S. Pekovich MINE at Hawk Iniot, undergrow Au, Ag. Idle 190 - TON GRAV FLOT adul.

ALASKA GOLD MOUNTAIN
MINES, LTD
TH Garfield Bldg, Loe Angeles, Calif
Pres: Charles F Hutchine
MINE at Ketchahaa, As, Ad
35-708 MBLL
Idle

ALASKA JUNEAU GOLD MMG CO
1022 Crecker Bldg, San Francisco, Calif
Pres: C A Borris
VPs: Worthern Bradley,
P.R. Biradley, &c.
Sec-Treas. D L. Feathers
MINE at Juneau, underground
Au. Ag. Pb. Idle
18, 999-1010 GRAV FLOT MILL
Gen Mgr. J A Williams
Aust Gen Mgr. E G Noless
Purch Agt: Rorthwest Lead Co

ALASKA METALS MNG CO
ROX 865, Fuiroants
STEPOVICH & COLBERT PROPERTIES
LODE MINES, Gilmore Dome,
Pairoants dost, Yulana & region, W
Under devel

ALASKA PACIFIC COMS
MNG CO
SOS Colman Blog, Sentile 4, Week
Pres: V A Montgomery
VP & Gen Mgr. Wm M Seekl
Sec: Carl W Siseman
INDEPENDENCE MIME, 26 and N of

Index

Alabama (See South) 176	Nevada 159
Alaska 125	New Hampshire
Arizona 129	(See East) 178
Arkansas (See Central) 175	New Jersey (See Bast) 178
California 133	New Mexico 165
Central 175	New York (See East) , 178
Colorado 144	North Carolina
Connecticut (See Bast) 178	(See South) 176
Delaware (See East) 178	North Dakota (See Central) 175
East 178	Ohio (See Central) 175
Florida (See South) 176	Oklahoma 166
Georgia (See South) 176	Oregon 167
Idaho	Pennsylvania
Illinois 151	(See Central) 178
Indiana (See Central) . 175	Rhode Island (See East) 178
Iowa (See Central) 175	South 176
Kansas (See Central) . 175	South Carolina
Kentucky (See South) , 176	(See South) 176
Louisiana (See South) . 176	South Dakou 168
Maine (See East) 178	Tennessee (See South) . 176
Maryland (See East) 178	Texas
Massachusetts (See East) 178	Utah 170
Michigan 152	Vermont (See East) 178
MARKET AND THE PARTY OF THE PAR	Virginia (See South) 176
Minnesota 153	Washington 172
Mississippi (See South) 176	West Virginia
Missouri 154	(See South) 178
Montana 155	Wisconsin 174
Nebraska (See Central) 175	Wyoming 174

To provide the greatest possible utility, this list of United States mining operations is presented alphabetically by state. Listings are carried under the name of the operating company, owning company, mine or individual operator, according to the wishes of the parties concerned.

The properties listed were all active and producing when surveyed, except in cases where "under development" and "idle" have been added. Totally inactive properties offering no indication of an early resumption of operation have been deleted.

Tonnages listed are for daily production, unless otherwise noted. Minerals and metals are listed in order of importance. An attempt was made to list personnel in the areas where they are active. Unless otherwise specified, mill and smelter addresses are the same as that given for the mine.

addresses are the same as that given for the mine.

The list was compiled after a careful survey of some 7,000 mining and processing operations, both active and dormant, in the United States and Alaska. Questionnaire forms covering major operating details and personnel were mailed over a period of six months. Where information supplied by the operator of owner was not complete, supplementary data obtained for Mining World field reports compiled by staff members during the course of nearly a half-million miles of mine-to-mine travel during the past few years and from records furnished by the Mining World news bureau and federal and state mining agencies.

While Mining World cannot guarantee 100 percent accuracy of this directory, it believes the list is the best obtainable from any source.

Your cooperation is sought to making this list as complete.

Your cooperation is sought in making this list as complete and accurate as possible. Please complete and mail the tear-out form on page 180 to insure receipt of the standard mine questionnaire form for your mine listing.

ALASKA PLACER CO
380 Colman Bidg, Sentile, Wester
Pres & Gen Mgr.; Ralph Leman
VP: C J Lomes
Sec-Treus: Select Groundger
PLACER on Nuclicit A, Council dist
Lemand Pouts reg. 3 1/3-4 decoips, Ac

ALASKA TIN CORP

ALASKAN ASSOCIATES, LTD AIT Equivable Bidg. Portland Gre General Partners: Sherwood B Owens, PO Box 1998, Tucsum, Arivons & James B Orr, PO Box 1998, Portland 7, Ore WG HURRAN GUARTZ MINE. Selomos. 45 mis E of Nome, sederaground, Au, Ag, WO3, ceiting as 50 ton ser day operation. Mine Supit. Travis P Lane Assa Mine Duol. Nirk W Edwarth Under development MILL, 50 tom daily, gravity, equivided.

ALLUVIAL GOLDS, 1MC
4558 University Way, Seattle, Wash
Pres & Gen Mgr. Eracet M Pathy
Dirs: Walter Seligman, E D Bull,
Mirz A D Mulkas
Millie on Wessimsport Cr, Curde dist,
Yukon R region, P O Fairbunke,
4-ft dredge, Au

AMERICAN CREEK EXPLOS CO
Box 388, Anchorage
Parthers: Bill Messimerely, E E Sargeott
Babe Alsworth, Ernic Pfaff
AMERICAN CREEK MINE, plecey, Au,
Ag, Idis, Box 368, Anchorage, 38 and
HE of Saknes
McNEL MINE, Sec 988, Anchorage,
17 ml W of Monishak Boy, underground
4 surface, Cu, Au, Ag
Under davelopment

ATLAS MINES Box 103, Nome
Gen Mgr. Geo Waldhelm
PLACER MINE, 100 on H of Hom
Kougarch dist, Seward Ponin reg
dragline deser-hydranism, Am
500-YD GNAV MILL

Fist SURFACE MINE Marvel Cr, Teleskesk-Aniak Diet, Dragline-buildozer

BARTHOLOMAE CORP 1033 Brog Rd, Pullerson, Calif Pres & Gen Mgr. W A Bartholomae, Sr GOLD PLACER MEYE, Gold Rus Cr Port Clarence COLD MINE, Ester Dome, via Fairbanks, Sdie Engr B W Vallat

BEAR CREEK MINING CO (subsidiary of Kennecott Copper Corp) Anchorage ORANGE HILL DEPOSIT, Cu, Mo, Au, Ag. Exploratory (See Kennecott Corp, New York)

BEATON, NEIL PLACER MINE near Ophir dredge on upper Games Cr. Au (Leased from Innoko Dredging Co)

BEAVER, JAMES O Talkeetna PLACER New York claim, Yentna dist, non-flowt, Au

BEDROCK MNG CO Ophir Pres. Tom Woolard Vice-Pres: Joe Woolard Sec: Ivor Carlson Asst Gen Mgr. Hjalmar Lindquist PLACER on Bedrock, 16 mi from Ophir domer-dragline-hydraulic, Au, WO₃

BELANGER, GEORGE & CAMERON, JACK BON 1771, Palmer PLACER on Albert Cr, Natchina dist Copper R reg, Joser-hydraulic, Au

BERG, L C Box 93, Sitka SILVER KING MNG CLAIMS, 18 mi EE of Wrangell, Wrangel dist, Ag, Au, Pb

BERRY HOLDING CO

Ill Suter St, Ban Francisco, Celif
Pres & Duane Bush
VP. Othmar Berry
Gen Mgr. Harold Christensen
FLACER on Eagle Cr., 115 mi NE
of Fairbanks
(Leased to Franca & Gibson)

BITTNER, PAUL
- Central
PLACER Deadwood Cr, Circle dist,
Hydraulic, Au

BLACK BUTTE MNG CO Fulmer FERN MINE, Willow Cr diet Cook Inlee-Susitna reg, lode, Au (Leased from Fern Gold Mag Co)

BLAIR, ANDREW
Talkeetna
PLACER Dutch Cr. Yentna dist, nonfloat, Au

BLUNDELL, JOSEPH B.
Big Lake
PLACER on Wake Up Cr & Jim Pup
Koyukuk dist, Au

BODIS, GEORGE Name PLACER on Dick Cr, Serpentine dist, Seward Penin reg, hydraulicdoser, Au (See Dick Creek Placers)

BRADLEY, C W & LYONS, L N Talkeetna GOLD PLACER on Cache Cr

BRIGGER, AXEL
520 E 3rd St, Fairbanks
PLACER on Owi Cr, 60-Mile dist
Yukon R reg, As

BRINER, MENRY
Homer
PLACER Penny Cr. Name dist, Au

BRINKER-JOHNSON CO
381 California St. San Francisco, Calif
Pres: W Johnson
VP: T Keith Johnson
VP: T Keith Johnson
VP: And Carlbou Cr., via Pairbañks
4 1/2-ft dreige, Au, Ag, Idle
(Owned by Walter W Johnson Co
Balfour Bidg. San Francisco, Calif)

BRONNICH, PRED Slana, via Gulhana PLACER on Slope Cr. Au BYSTEDT, JAMES A 537 LSt, Aachorage PLACER on Bear Cr, Aniak dist Kuskokwim R region, Au

CALLAMAN ZINC-LEAD CO Livengood LIVENGOOD PLACERS, 80 mi N of Fairbanks, Au, dredge Mgr. Bruce I Thomas Suptr Douglas Colp (See Comundo and East)

CANNON, ROBERT Teller PLACER on Birch Cr. Nome dist, Seward Penin region, Au

CANYON CR MNG CO
Akiik
Gen Mg: Jone A Kvamme
PLACER on Canyon Cr, Aniak dist,
Kushokwim R reg, dower-sluice
plate-hydraulic, Au

CAB, & TOM Livengood PLACER Julian Cr, Tolovana dist, Au

CARSTEMS, B C
Central
PLACER on Portage Cr, Circle dist,
Yukon R reg, doser, As
CASA DE PAGA GOLD CO

CASA DE PAGA GOLD CO
411 Hoge Bldg, Bestute 4, Wash
Pros. Robert Gillæpie
Sec-Treas. Robert L Stitt
Gon Mgr. D A Slewart.
Directors. Robert Gillespie, Ken Fisher,
D A Stewart, Robert L Stitt,
G H Watkins
IMMACHUCK RIYER PLACER, c/o Weins
Air Lines, Nome, 20 mi from Deering,
2 dredges, 3 doarer, Au
Prod. 408, 00d cu yds

CHAPPEL, OLIVER L.
Witeman
PLACER on Thompson Pup, Koyukuk
dist, Yukon R reg, hydraulic, Au

CHATHAM CR MNG CO Fairbanks PLACER on Chatham Cr, Pairbanks diet, Yukon R reg, dragline-dozer, Au

CIRCLE DREDGING CO Miller House PLACER Crooked Cr, Circle dist, Au

CLINE & CLINE PLACER
Cape Yakataga
MINE, 140 ms SE of Cordova, Au, Ag
Under devel

COLLINSVILLE MINES, A
PARTNERSHIP
1537 HS, Anchorage
GOLD PLACER, 2, 800-yd dragline 4
nonfloat wash pl, 100 air mi NW of
Anchorage
Foreman Carl Durand

COLORADO CREEK MNG CO McGrath Partners: John Z & Richard S Fullerton PLACER, 60 mi N of McGrath on Colorado Cr., Au, Ag Prod: 2,000 cu yda

CULVER, RICHARD H Tulkestma PLACER Prospect, Yentna dist, Au

CUMMINS, LARRY c/o B & K Trading Co, Talkeetna PLACER Thunder Cr, Yenna diet, Au

CURRAN, PETER Solomon PLACER Penny Cr., Nome dist, Au

DANL, ROBERT Tulkerton #2 BELOW on Nugget Cr. Yentna-Cache Cr diet, Au

DAWSON MINE
Route: Wendell Dawson
MINE, Mil.L., Keichikan dist,
SE Alaska region, Au, Ag

DEADWOOD MINING CO E H Wrese 2315 N 63rd St, Seattle, Wash PLACER Independence Cr, Circle Dist, non-float, Au

DE COURCEY MT MNG CO, INC Bon 1714, Anchorage Frex Ed Tousial Vice-Pres John McCormack Sec Ray Wolfe Eng in charge. Paul M Sorensen RED DEVIL MINE, 7 mis 8 of Sleetmute, Hg DE COURSEY MINE, 18 mi N of Crooked Crock, Hg Under development

DEGNAN, JA MNG CO Ophir PLACER on Esperanto Cr. Innoko dist, dragline-doser, Au

DEMPSEY, C L Box 323, Nome PLACER on Lower Willow Cr, 50 mi NE of Nome, 2 1/2-ft bucket dredge, Au Under devel

DICK CREEK PLACERS
Nome
PLACER on Dick Cr, Serpentine
dist, Seward Penin reg,
hydraulic-dozer, Au
(See George Bodis)

DONLIN PLACERS
Crooked Creek
Owner: Robert F Lyman
PLACER in Snow Guich 19 mi N
of Crooked Cr. Aniak dist,
Kushokwim Miv reg, deser, Au
(See Robert F Lyman)

DOYLE, JERRY
Hot Springs
PLACER on Woodchopper Cr
Hot Springs dist, Yukon Riv reg. Au

DUTCH CREEK MINE Talkeetna Owner: Mike A Trepte PLACER near Yentne, hydraulic monitors, Au

DUTCH CREEK MNG CO Council PLACER Dutch Cr, Council dist, nonfloat. Am

EDGECÜMBE EXPLOR CO Bon 75e, Sitka, 218 S Hudson, Pasadena S, Calif Pres: CT Morgan VP C A Haley Treas-Gen Mgr G H Morgan Sec: A Holden EECO MINE, 10 mi SE of Sitka, Au, Ag, shaft & adti ESE EECO GRAV MILL at Silver Bay Gravity (Sec Calif)

EDWARDS, HIRK Sulamen QUIGLEY'S HYDRAULIC MINE, Nome dist, Seward Penin reg PLACER on Solomon R, hydraulic, Au

ENGELHORM, FORREST L Los Molinos, Calif PLACER on Cache Cr., Au

ENGSTROM, HERBERT 512 Bowdsin Place Seattle, Wash JUNE 92 PLACER, Box 554, Basin Cr. 16 mi N of Nome, nonfloat washing pl, Au

ENSTROM & MCDOUGALL Best Springs PLACER on American Cr. Hot Springs dist, hydraulic-dozer, Au

ERICKSON, HALVER Tulkerter PLACER Prospect, Youtne dist, Au

PALLS CREEK MING CO Seward Pres & Gen Mgr: S A Liening VP & Sec: A R Bergersen SKEEN LECHNER MINE, Au, Ag 25-TUN FLOT MILE Lile FERTON, R M
Box 1207, Pairbanks
MORELOCK MINE, PLACER on
Rosa Cr, Melositna dist, Yukon
Riv reg, hydraulic-dozer, Au
(See Morelock Mining Co)

PERN GOLD MNG CO 502 Columbia Bldg Spokane, Wash Pres: J L Drume VP. Martin Woldson Sec: L R Gordon FERN MINE, Palmer underground, Au 60-TON AMAL-PLOT MILL SMELTER, Tacomm, Wash

FRANKLIN MINING CO Chicken Fartners: Howard Bayless, Dick Roberts, Bob Roberts & Ellis Ribberts PLACERS at Franklin & Chicken, hydraulic, dragline, dower, Au (Leased from Fred Whitehous)

FRANSEN, GUS
GUSTAGO
PLACER on Slate Cr. Chistochina
dist, Copper Riv reg, Au

FRASCA & CO
Box 1882, Fairbanke
PLACER on Eagle Cr., Circle dist,
hydraulic-dozer
(Leased from Berry Holding Co)

GAMBLIN, SAM Box 123, Fairbanks RAMBLER MINE Boulder Cr, Tok diet, Sb

GILLETTE, B F
Noone
PLACER on Anval Cr. Nome dist,
shovel-in, Au

GODFREY, S L.
Nume
PLACER Kougarok River, Kougarok
dist, non-float, Au

GOLD DUST MINING CO Kotsebue Gen Mgr. John L Bullock PLACER on Kougara N of Nome, bucket dredge, Au Under devel

GOLD MINT MINING CO Hope Gen Mgr D Whiting PLACER on Palmer Cr. Hope dist, Kenai Penin reg, Au Idle

GOLD PLACERS, INC
4556 University Way, Seattle, Wash
Pres & Gen Mgr E N Paty
VP: Walter Seligmon
Dirs E B Bull & Mrs A D McRae
GOLD PLACER, Coal Cr,
Circle dist, 4-yd dredge

GOODNEWS BAY MNG CO, INC
422 White Bldg Seattle, Wash
Pres: A O Olson
VP: Edward Olson
Sec: R W Vinnedge
Treas: C J Johnston
GOODNEWS BAY PLACER, bucket
line dredge, hydraulic-draglinedoser, P!
Supt. Edward Olson
Purch Agt. John C Hill
Eng: W Spencer

GRANITE CREEK MNG CO Ruby W Carlo PLACER on Ophir Cr, 50 mi S of Ruby, Ruby dist, Yukon Riv reg, hydraulic dozer, Au

ORANT LAKE MINE
MROSE PASS
OWNER: Wm Kelley
QUARIZ MINE 4 mi from Moove
Pass, irregular vein, block
caving, Au, Ag
GRAY MILL & SMELTER
Under dave!

GURTLER & MYKLEBUST e/o Grover E Gurtler, Ophir PLACER on Little Cr, Innoko dist Yukon Riv reg, dragline-doserhwdraulic. Au HAGEN, C A H Nume PLACER on Nome Beach, Nome dist, Seward Penin reg, Au

HAMILTON, RAY & ASSOC Millerhouse Gen Mgr: Ray Hamilton HYDRAULIC PLACER 9 mi S of Millerhouse, Au idle

HANSEN, N G TRADING CO Kotzebue Au

HARD, ERIC Ophir Owner: Eric Hard BEAR CR PLACER, Folger, Au Mine Supt: Eric Hard Under development

HASSEL MNG CO Box 1071, Fairbanks PLACER MINE, Ready Bullion Cr. Fairbanks dist, Au

HATTON & TURNER
Fial
PLACER at head of Chicken Cr.
Iditarod dist, dozer-hydraulic, Au

HAVRILACK, HARRY F Rampert PLACER on Gunnison Cr Rampert dist, Yukon Riv reg, Au

NAYES & WHITELEY
ENTERPRISES
810-1th St, Juneau
Co-Mgrs: Howard C Hayes &
5 P Whiteley
ALASKA JUNEAU TAILINGS,
partial opr. placer, Au
CHICAGOF TAILINGS, cleanup
opr only, placer, Au
100-70N GRAV FLOT MILL
TREADWELL TAILINGS,
temp suspended, placer, Au

HIRST-CHICHAGOF MNG CO
415-7th Ave S, Seattle, Wash
Pres: Goo A Meagher
Vice-Pres: Frank Sperkert
Dirs: Wallace Lee Kay, W Sham Chinn
Sec: Dan Goon
HIRST-CHICHAGOF MINE, lode, Au
Under devel
50-TON AMAL FLOT MILL

HOLMES, WALTER Maycreek via Cordova PLACER Dan Cr Nizina dist, hydraulic, Au

HOSLER MINES
McKinley Park
Gen Mgr; Elmer Hosler
PLACER on Eureka Cr, Kantishna dist,
Yukon R reg, hydraulic-dozer, Au

HOPE MINE c/o R V Watkins, Box 521, Pairbanks PLACER on Deep & Faith Cr, hydraulicdoser. Au

HOWARD, A L Platinum PLACER PROSPECT, Red Mountain, Pt

HUNTER CR MNG CO c/o Melo Jackovich, Box 92, Fairbanks PLACER on Hunter Cr. Rempert dist, hydraulic-doxer, Au

IDITAROD OPERATING CO Box 53i, Tanana Partners: Frank G Edgington & Lars Indegard PLACER on Goiden Cr., 30 mi W of Tanana near Kallanda Landing, Au

JACKSON MINE
Box 985, Fairbanks
Owner: Nels Jackson
PLACER at Totalarnika R, Boanifield dist, hydraulic-doser, Au

JENKINS, FRED F Eagle PLACER on Flume Cr. Au

JOHNSON, HELMER Box 935 PLACER on Cleary Cr. hydraulicdozer, Au

JOHNSON, PETE & ISAACSON Hot Springs PLACER on Eureka Cr, Hot Springs dist JOKELA & LAZERATION
Bow 2000, Fairbanks
Partners: Verne Jokela
Charles Laseration
GREENBACK CLAIMS, 28 ms N of
Fairbanks, underground, Au, Ag
(Leased from Cheechako Ming Co)

KELLY, JOSEPH D 626 D St. Anchorage PLACER Faith Cr Pairbanks dist. Au

KLOSS & DAVIS
Partners Herman Kloss and
Jack Davis
K & D MINE, 2 mi from Sunset Cove,
Petersburg dist, SE Alaska reg,
underground, Au, Ag, Sb, Zn, Pb, Zn
K & D MILL

KOBUK MINES
Box 1015, Pairbanks
PLACER Dahl Dr. Kobuk dist,
non-float, Au

KOUGAROK FREIGHT &
MNG CO
Bux IN
Partners E C Straub & E Towner
PLACER II mi NE of Nome, Au,
30,000 yds yrly
Under devel

LACROSS, JACK
Boundary
PLACER Turk Cr. Fortymile

LANE, T P

Numbe
BIG HURRAH MINE, Nome dist,
Seward Penin reg, lode, Au, W
BIG HURRAH MILL, rehabilitation

LANGLOW, JENS
Central
PLACER on Smith Cr, Circle dist,
shovel-in, Au

LANNING, TONY
Manley Hot Springs
PLACER Omega Cr, Hot Springs
dist, Au

LARSEN & KEMP DRIFT MINE on Woodchopper Cr, Hot Springe diet, Au

LEE BROS DREDG CO Solismon Gen Migr: Richard Lee PLACER on Solomon Riv, Soward Penin, buckettine, Au, Ag Prod; 7,500 yds Engr: Allan W Lee

LEONARD, HARRY B
Wiseman
PLACER on Smith Cr. Koyukuk dist,
shovel-in, Au

LITTLE MINOOK MNG CO

Box 1505, Fairbanks

Pres & Gen Mgr. Albin Martin

PLACER on Little Minook Cr.,

Rampart dist, dragline-hydraulicdozer, Au, Ag

Prod 800 vds

LONG CR MNG CO Ruby Gen Mgr: Hans Tilleson PLACER at Long Cr, Hydrauliedozer-dragline, Au, Ag

LOST CHICKEN HILL MINE, INC Chicken Gen Mgr. George Turner PLACER 293 mi E of Fairbanks, hydraulic-dozer, Au

LUCKY NELL MINE
Hollis
Owner: J J Matuska
MINE 7 mi W of Hollis,
underground, Au, Ag, Pb

LUCKY SEVEN MINE Millerhouse Opr: Walter Roman PLACER on Mastedon Cr. Circle dist, dozer-hydraulic, Au

LYMAN, ROBERT F Crooked Creek Owner: Robert F Lyman DONLIN CR PLACERS, 18 mi N of Crooked Cr. Au Mile MACKLIN CR MNG CO Kougarok via Nome PLACER Macklin Cr, Kongarok diet, non-float, Au

MAPHIS, PAUL S
Shaw & Maphis, 1015-17th St.
Edmonds, Wash
PLACER on Dutch Cr, Council
dist, Saward Penin reg,
doser, Au

MARVEL CREEK MNG CO Aniak Gen Mgr: JC Awe MARVEL CR MINE, dragline-doserhydraulic, Aw Prod: 1,000 yds

MAURER, ERNEST
Box 728, Fairbanks
FIRST CHANCE CR MINE, open pit
and placer, Au
SLATE CR MINE, Kantishna dist, Sb

McMAHAN, C H
Box 1814, Palmer
PLACER on Albert Cr, Nelshina dist,
dozer, Au

MELDRUM, W M Chicken NO 1, above Discovery Claim on Chicken Cr. 40-bile dist, open pit and placer, Au

MICKEL, JOSEPH Nome PLACER #6, above Discovery on Kougarok dist, Seward Penin reg, shovel-in. Au

MIDDLE FORK MNG CO 803 Arctic Bldg, Seattle, Wash Pres: H E Cleveland PLACER at Gulkana, Au Gen Mgr: JF Malong Engr: MW Jasper

MILLER, FRANK J Box 614, Fairbanks PLACER on Sheep Cr., Koyukuk diet, shovel-in, Au

MISCOVICH BROS
Box 736, Fairbanks
PLACER on Otter Cr. Iditared diet,
Yukon Riv reg. discovery claim, Au

MORELOCK MNG CO Tarana PLACER on Rosa Cr. Melozitas dist. doser-hydraulic

MUMTRAK MINERS Gaodnews 527 L St, Anchorage (winter mo) Pres & gen Supt: James A Bystedt VF. James Heverling PLACER 21 mt from Platinum, Au Prod: 300 yds daily

MUNZ, WILLIAM S Nome PLACER on Rock Cr. Council dist, Seward Penin rog, Au

MURNION, JAMES
FRITBUREN
PLACER on Ester Cr. Innoko dist, Au

MYRTLE CREEK MNG CO 811 American Bldg, Seattle, Wash Partners: F H Molitor and John Repo Est PLACER OFF, Box 766, Fairbanks, on Myrtle Cr, 200 mi Nof Pairbanks, dragline-dozer, Au, Ag

MATIVE BISMUTH, INC Box 287, Nome Pres & Gen Mgr: O E Margraf VP. D M Russell CHARLEY CR BISMUTH MINE, 38 mi N of Nome, underground, Bi, BigSg; Au Under devel

NELSON, H L Gulkana PLACER on Millers Gulch, Chistochins dist, Au

RESLAND & CO
Wiseman
PLACER on Vermont Cr., Koyukuk dies,
Yukon R reg, dragline-doser, Au

NEW YORK-ALASKA GOLD DEEDG CORP 1616 Smith Tower, Seattle, Wash Pres & Man Dir J K Crowdy VP, G G C King Sec. Mark Mathewson Tress Pannie Berley Purch Agt L E Robbins
NEW YORK-ALASKA MINE, 60 mi
NE of Bethel, placer, 3 dredges,
dragline, Au
Ree Mgr: Wm H Race
Asst Mgr: M F Bailey
Elec Engr: Clarence Clark
(See Wash and East Listings)

NIEMI, WAYNE J Box 1791, Mountain View PLACER on Niekluk Riv, Council Bluff diet

NO GRUB MNG CO Box 888, Pairbanks Edwin E Brenner PLACER Under development

NORTH AMERICAN DREDG CO Fist Owner. Alex Mathieson. PLACER at Plst, Iditarod dist, 2,500 yd bucketline, dredge, Au

NORTH FORK DREDG CO
Research
Owner P L Reader
HARRIS CR MINE, 100 mi N of
Nome, bucketline, placer, Au
Bills
(Leased by Mrs A D Peterson)

NORTHERN TIN CO
clo Muns Airways, Nome or
Ti09 Woodlawn Ave, Seattle S, Wash
Pres. Axel Palmgren
VP. Andrew O Oison
Gen Mgr & Sec George Ramstad
Assi Gen Mgr & Purch Agt:
A Wm Ramstad
PLACER OPR, Buck Cr, 120 mi NW
of Nome, Sn, Au
Mine Supt George Ramstad

NOVATNEY, MR & MRS R A Box 1841, Juneau Pres & Gen Mgr R A Novatney Sec-Treas Dorothy Novatney MILLER LEDGE & LODGE MINES, Box 1817 Ketchikan, surface, placer Mine Engr: Harry Townsepd Under devel

OLIVE CREEK MINES Box 552, Pairbanks Gen Mgr. Carl Parker PLACER on Olive Cr. 80 mi NW of Pairbanks, dragline-dozer, Au, Ag

OSTNES, LARS & CO
Fortuna Ledge
Mgr: Lare Osines
PLACER on Willow Cr, Marshall
dist, Yukon Riv reg, draglinedozer-hydraulic, Au

P H & H MINING CO Box 462, Fairbanks Pariners: F D Parker, J W Raymond F O Hopkins F R & H PLACER of Henry Cr, Nome dist, dragline-dozer, nonfloat, Au, Ag

PILGRIM, EARL R & CO Box 1898, Pairbanks Gen Mgc. Earl R Pilgrim STAMPEDE MINE, 110 air mi SW of Pairbanks, surface, 3b, Explor for DMEA only in 1853 STAMPEDE GRAV MILL Prod: 30-ton idle

PITTS, E M
Big Lake
LAKE CR PLACERS, Big Lake,
hydraulic, Au, Ag

PRICE, STAN
Windham Bay
PLACER, 1/4 mi from float head
of deep water, hydraulic-dozer, Az, Zr

PRINCE CR MNG CO
Fint
Owner: Harry Agoff
PLACER on Prince Cr, Iditarod
dist, Yukon Riv reg, hydraulic, Au

PRINGLE, A W
Hot Springs
MINE on Rhode Island Cr. dozerhydramile, Au

PURDY, FRED & ARTHUR Chicken PLACER on Myers Pork, 40-mi dist, Yukon Riv reg, doser-hydraulic PURKEYPILE, I W
Box 572, Fairbanks
PLACER on Tesimeran Cr.,
30 mi W of Tenana, Explor only, So, Au

QUAIL CR MMG CO 172 Hall St, Fairbonks Co-owner: While H Redig PLACER on Qual Cr, Rampart dist, Yukon Riv reg, deser-hydractic, Au

RAINBOW MINES
Nume
Partners: Frank H Wholey &
Sterling A Montague
PLACER, DO and W of Nome,
placer, Au
Under devel

REDIG & HAUGDANL 172 Hall Rt. Petrtumes PLACER on Quail Cr. Rempart diet. A

RENSHAW, A L & BROWS Size 1875, Acchorage GOLD CORD MINE, Willow Cr diet, Icde, Au

ROBINSON, GEORGE P Boundary PLACER on Wade Cr, 40-361 dist, Yukon Rév reg, Au

ROBINSON, HILKEY
Haycock
PLACER on Swoopstake Cv., Mayulitas, Au

BOSANDER & REED .
Optier
Free: T Resember
PLACER on Yankee Cr., Insule
dist, hydroxist-desor-dregline, Au

RUNNELS, R L Guitara PLACER on Millers Guich, Au

SANTIAGO-ALASKA
MINES INC.

117 Commercial Bidg, Erenthau
Pres: R. Cross Search
VP: CR M Cale
Sec-Trens: S B Snell
MINE, Dolomite, undergraund, A
higr: B Twell
Engr: W Erickson
108-TOR CYANDE MILL
Mgr. W Griffsthe
Under Sovel

SAVAGE & MATHESOR Ophir Oen Mgr: Mugh Matheoen PLACER on Spruce Cr, hydraulicdower, Au

SAWTOOTH MMG CO
Box 1505, Fairbonks
Owner, Fred Waxkawith
SAWTOOTH MINE, Lavengood diet, So
lille

SCHAEFER, RUSSEL & Crooked Creek PLACER on 47 Cr. Kuckekwim reg. deser-slutce bosses, As. W

SCHWAESDALL Fairbanke PLACER on Myrtle Cr. Y Koyukuk dist, Yuhon Riv reg, Au

SNOWBIRD MNG CO. SNC Box 1719. Anchorage Pres & Gon Mgr. Chrus Poulsen VP: H A Farce Sec-Treas. Charles J Johnston ENOWBIRD MINE, 22 and N of Palmer, underground, Au FLOT MILL.

SOURDOUGH DREDG CO Nome Partners. Chester Milliagon, Jock LaCross, H E Jonessy MINE at Council, bucketime, As

SQUAW CR MNG CO c/o Jack Wilkey, Boundary PLACER on Squaw Cr, 40-Mil Mat, dragline-dotor, Au

STABLES BROS Windman PLACES on Portuping Cr., de STANTON, MAROLD Talkeston PLACER on Upper Palls Cr., Yeston-Cache Cr diet, hydranile, Au

STEEN, MARRY & OGRIZ Ophir PLACER on Otter Cr., dredge, As

STRPHENS, V Box 774, Anchorage PLACER on Nugget Cr. Au

STEPOVICH MINE Fair-same Owner: Mike Stepovich FLACER on Lower Figh Cr (Leased to US Smelting & Ref) (See Alaska Musale)

STRANDBERG & SOPE Box 2009, Anchorage PLACER on Cardie Cr, McGrath dist, Kushokwim reg, bucket-line dredge, As DAY LAND DREDGE on Indian Riv, Sughee dayl, Yulon Riv reg, Au DRY LAND DREDGE on Colorado Cr, Innoko dist, Au

STUVER, JULIAN First PLACER on Mappy Cr. Listarod dist, hydraulic. As

SWANSON BROS Haycock Pariners. Albert & Emil Swanson PLACER on Hunter Cr. 4 ms E of Rampart, hydraulic-doser, Au

SWATCH, AL Feirbacks PLACER on Corpus Christi Cr., Au

WEEPSTAKE MINES
Hayoock
Partners: Patrick J Bliss &
Charley Meon
PLACER 30 ms HW of Hayoock on
Sweepstake Cr. Apdraulic deserdragline, Au

TARASKI, A 8
Talkerina
PLACER on Cache Ce, Venina dest,
hydraulic, Au

TIGER TALISMAN PLACER Box 294, Nome Gen Mgr. J H Alexander 250-yd hydraulic-doser, Au, Ag

TILLICUM MNO CO
c/o Geo Roberts
Box 238, Ketchikan
CAAMANO POINT MINE, Ketchikan
diat, 36

TIMBERLINE PLACERS
Pairbanks
PLACER on Porcupito Cr. Circle

TRONSTAD & GOODWICK c/o Ted Tronstad, Box 1045, Fairbankia PLACER on Dahl Cr, Skungsak dist, hydraulist, Ass

TUCKER, S A
Haycock
PLACER on Sweepstake Cr. Keyak
dist, Yukon Riv reg, Au

TWEET, N B & SOWS
Teller
PLACER on Dahl Cr. Kougarok dast,
hydraulic, Au

ULEN, E J Wiseman PLACER on Nolan Bench, Kopubah dasa, Appleaulic, An

U S SMELTING, REFINING &
BINING CO
Box 1170, Fautbanke
WP & Gorn Mgr., Alaskan Opr.
J D Crawford
PAIRBANKS DEPT, 8 gold dredges
at Fairmanks, 1 gold dredges
at F

MOME DEFT, 4 gold dredges Mgr. C 5.Glavinovich Supt: W A Olavinovich Cushter: Echt Baltwin (See Ariz, Utah, New Mex and East Listings)

U S TIN CORP

Box 2554, Eunein
Pres & Gen Mgr. Kenneth J Kadow
VPs: F H Fursy, A F McIntowh
Sec: W L Gishlon
Met: R J McCrary
Gen Supi: Domand Mcchereperger
Purch Agt: J J Colmone
Treas-Comp: Henry E Schaefer,
200 Journ Blidg, Sewrie, Wash
LOST RIV TIN MINE, Love Ray, 98 ml
NW of None, underground, placesdozer, So, WOS
Prod. 100 time
Mine Engr: Jack Fergusom
109-TON GRAY MILL
Mill Supt. R J McCrary
Assayer. Paul Hwang
SMELTERS at Tense Coty, Tex

WACKWITZ, PRED Box 1595, Fairbanks PLACER on Bedrock Cr. Fastbanks dist, showed-in, Au LODE, head of Cleary Cr. Ph

WARWICK MIMES
Box 807, Fairbanks
Gen Mgr. Andy Warwick
Gen Supt. W M Warwick
Acct. E M Warwick
PLACER on Gertrude Cr. 2 ms W8
of Livengood, hydroelic-doser, die
ORAY WELLS.

WEAVER, VERNON & RAMBAUD Chicken PLACER on Napoleon Cr

WEIMARD, FRED Candle PLACER on Jump Cr & Mud Cr, Pairhaven dist, Seward Penin sug, dragline-dozer, &u (See Jump Cr manes)

WEISNER, IRA FRIEDRICH PLACER ON NOODIET Rampart dist, shovel-in. Au

WMITEHEAD, FRED Chicken PLACER on Chicken Cr. 40-Ma dist, Yukon Riv reg, dragimedoser-hydraulic, Ru

WICKSTROM & CO Fairbunks PLACER on Chathom Cr. dragitusthreer, As

WILBUR CR MINES Livengood PLACER on Wilber Cr, Tolovana dist. Au

WILDT, FRED
Box 163, Fairbanks
PLACER on Homestake Cr. shovelin, Au

WILKINSON, R. R. 16540 Aurmen St., Seattle, Wash. PLACER on Miller Cr., Cerebe dust, non-float washing pl, Au

WIRUM BROS
Box tdl, Nome
PLACER on Dome Cr. Kougarwk dist,
dragline-deser, As

WITHROW, A Fairbooks PLACE OPR on Bedrock Bar, Koyana Riv. Au

WOLF CR MNG CO Box 141, Pairbenke Pres. Addrew Anderson Gen Mgr. Norman Gusteroon PLACER, dragtuse door-bydraudie Supt: Mannie Glasse Under devei

YUKON MNG CO 530 E 89th St. Scattle S, Wash MINE, Kako Lodg, Au YUKON PLACER MNG CO Box Hob, Fairbanks Partners: C F Herbert, Earl Ellingen, L J Stampe, Olen Franklin, Harold Schmidt 60-MHLE OPM, placer at Glacker Cr, hydraulic-dener & 4-R dradge

ZAISER, CLARENCE Ruby PLACER on Timber Cr. drift, Au

ZENDA GOLD MNG CO 635 Securities Bidg, Seattle, Wash CAPE CREEK MINE, 150 mi # el Home, Sn, drilling in Cape Cr & Boulder Cr Else Wash)

ZIMMERMAN MINES
Fairtanha
Owner: A A Zimmerman
PLACERS on Independence Cr ex
Millerhouse, hydraulic-dragline, Au

ZURER, W J Miller Hause PLACER on Maquadon Cr, Carolic dist, Au

ADDENDA

ALASKA EXPLOR & MING CO Box 130, Pullman, Wash Pres. W C Mays Sec-Treas: J E McCoy Mgr. Milke A Trepte PLACER on Bird Cr ax Talkeetma, Yentna dist, hydraulic, Au ti.eseed to Milm Trepte)

ALDER CREEK MNG CO Bon 1999, Pairbanks Partner: N E Sather Mgr: J P Drables FLACER on Fairbanks and Alder Cr. Fairbanks dats, dragline-dozerbydraulic, Au

AMERO, A W
Chandalar
NO 2 above Upper Discovery on Big
Cr. Yukon R region, placer, As

ATTWOOD, MERTON J Metaine Fails, Wash PLACER MINE, Chickon, draglinedoser, Au

BARGE, EDDIE 3 Talkeetus PLACER, Dunch Cr., Yennus diet, hydraulic, Au

BARRETT, PRANK Chicken PLACER on Stonehouse Cr. 40-MI dist, Au

WASKEY, WREN & WOLPE Bes 81, Dollungham RED TOP MINE, 15 ms N of Dallingham, surface, Hg

ARIZONA

ABE LINCOLN COPPEN CO Wichenburg MINE, Maricopa Co, Co Mgr: E 8 Millo

ABRIL MINE
Box 760, Tucnes
MINE, Tombatone, Cashica Co, Za, Cu
Mgr: S B Owens

ADAMS #3 MINE
Box 21, Yuma
Ope: H C Hudson
MINE, Yuma Co, Ag, Po
Idle

AKREN MINES
2207 N 24th St. Phossits
Pres: J A Alares
Gen Mgs: Pred Joukins
PIONEER MINE, 20 ma E of
Florence, underground a surface
Au, Ag. Cu, Po
Under devel
Assay: Charles Deal

ALEXANDER, T W & CLARK, ERMEST Box 299, Prescott US GROUP, Yavapai Co, Po, Zo

ALKEY MINE
Turnistum
Owner. E B Escapule
Pb, Ag
Mgr. Jeff Humphrye

ALLISON MINE Box 745, Tucson Opre: Mourice Hedderman & Otto B Dank MINE, Pime Co, Au

ALTUDA MINES 1980:
PQ Bus 1943, Yurna
Pres: James V Spagms
VP: Doyle Gills
Gen Mgr: Harry E Hamilton
Asst Gen Mgr: Doyl Gills
ALTUDA MINE, 25 ml SE of Gila
Bend, underground, Au., Ag
Lifts

AMERICAN COPPED CO (Formerly SUBSET MENING CO) 312 Cabid Bldg. Seethem. Cabid Pres & Gen Mgr: Paul H Boether VF: Man Elsen See: W H Anderson Gen Sapt: L. C. Wyman Purch Agt: Paul H Boether SUNSET MIRE, D mi SW of Superior, underground, Cu, Au, Ag Mine Supt: W O May

AMERICAM SMELTING &
REFIRING CO
MESTERN MAG DEPT SW DIV
el3 Valley Nat'l Blag, Twesses
Mgr. TA Snedden.
Ch Geol: Kenyon E Richard
TRENCH UNIT, Patagonia, underground, Pb, Ag, Zn
Supt: D R Jameson
1904-TON FLOT MILL.
HAYDEN FLATH, Nayens, 1390-tone
smeit & cons, Cu
Supt: F J Downsey
SW GRE PURCH OFFICE
el0 Valley Nat'l Bidg, Tuccon
Mgr: Reed F Welch
Silvers Bell. UNIT
Gee Colo, Calif, Ide, Mont, New Max,
Utah, Wash, Central, and Enert)

ARI-MICH MINES, INC
BOX 701, Prescott
Pres & Gen Mgr: C W Gabrieleon, Sr
VP: Harold Gates
Sec: Lynwood Webb
Gen Supt: C W Gabrieleon, Jr.
CATOCTES MINE, 12 ms 3 W of
Prescott, underground, Ag. Au,
Pb. Zn, Cu
Linder dewel

ARIZONA CONS GOLD & COPPER MINES CO Flurence Mgr: JF Johnson, 122 S Mess Bivd, Mess

"

ARIZONA COPPER WIMES INC Oracle Pres: JE Moewinche Gen Mgr: W R Shankila MINES, 20 mi N of Tweesa, Cu Supt: Levis Stickred ARIZONA EASTERN
PLUORS PAR CORP
BON 186, Duncas
Pres: Leo A Dealrick
VP: Paul Rourt
Gen Mgr & Met. L. K. Diffenderfer
Sec: Fred Haselhorst
Come Eng: Frank R. Wicks
LONESTAR FLUORSPAR MINE, 6 mi
8 of Benson, underground
50-TON FLOT Mills, Duncan
Mill Supt: L. K. Diffenderfer
Rill Foreman: Salvador Garcia
Assay: Harrison A Duna

ARIZONA GYPSUM CO Winkleman Mgr: J M Champie MinE in Pinal Co, gypsum

ARIZONA METALS CO Box 1266, Kingman Pres & Gen Mgr: R R Langley SUMMIT ALPHA MINES, Au, Ag, Cu. Pb. Zn

ARIZONA MINE, THE Box 142, Humbelt Gen higr: Verdin Alexander ARIZONA MINE, THE, 2 1/2 mi W of Humbolt, Au, Ag, Pb, Zu Under devel

ARIZONA MNG CORP Box 162, Chloride Sec: F N Lubre, 17 John St, New York 38, N Y SAMOA GROUP, Mohave Co, Au, Ag, Pb, Za, Cu

ARIZONA PORTAL CEMENT CO RILLIO Mgr. A L McCall MINE, MILL, Pima Co, limestone

ASH PEAK LEASE BOX 208, DURCAN COMMENCE & SHARDOCK MINES Ag Prod. 190 mes Gen Mgr. Howard Mettier

ASSOC MNG CO
PUTKET
Pres: A C Bureger
RIO VISTA, BILLY MACK, SUE,
CAPILANO, MAMMON & LION
BILL MINES, CU, AU
Gen Dir. A O Lofquist

ATHLETIC MMG COBox 792, Safford
Pres: Raymond F Orr
VP & Gen Mgr. Harvie L Horton
Sec: Ander K Orr
HEAD CENTER & BROW CAP MINES,
12 mi NW of Klondyke, underground,
Zn, Pb. Cu, Ag, Ar
Frod: 166 kms
Mine Supt. A Bosworth
Mine Fureman. Ellon Rode
166-TON PLOT MILL, Klondyke
Mill Supt: Borden Burlesen

B S & K MINIMG CO
PO Box 4434, Phoenhy
Pres & Gen Mgr; A M Kaisf
VP: William W Simon
Sec-Treas: Lee Newsom
Gool: Seton S Williame
ATLAS MINE, PO Box 6, Red Rock,
19 mi SW of Red Rock, underground,
Zn, Cu
Hosher devel
Prod: 30 tune
123-TON FLOT MILE, 10 mi SW of
Rad Rock

BAGDAD COPPER CORP
Bagdad
Pres: J C Lincoln
VF: Frank Snell
Gen Mgr: Ernest R Dickie
Metal: E S Howelf
Elec Engr: W D Descen
Sec: R H Jamisen
Gen Supt: G W Colville
Metch Engr: Ch Hammon
Safety Engr: Ch Hammon
Safety Engr: J H Schaitheis
Mine 120 mi N of Phoenis,
open pit, Cu, Me
Pred: 3, 596 tons
Mine Supt: Girl Hondrum
Mine Foremen: D S Pike, H T Stewart
3, 500-TON FLOT MHLL, Bagdad
Mill Swyt: Gaylen Goest
Mill Swyt: Gaylen Goest
Mill Foremen: B P Mullind, D van
Tilborg, A T Weatherhead
Assay: D T Jones

BANNER MNG CO 550 First Nat'l Bank Bidg, Oklahoma City, Okla Gem Mgr: A B Bowman, Sahuarita MINERAL BILL, MINE, Pima Co, Cu Under devet Supt: E E Bray

BARTMUS, BROCK & DUKE Kingman Owners: Peter Barimus, Jr. Richard Brock, Stanley Duke, Earl Duke SEXTY-THREE MINE, 15 ml from Kingman, underground, Ag

BEYERLE, RUPERT & SON Wegales EASTERN EXT MINE, 14 mi S of Patagonia, underground, Ma

BIG CHIEF GROUP Box 145, Prescott Owners: Fred L Kohlburner & William Lambuth MINE, Yavapai Co, Au, Ag, Fb

BISMUTH MINE
FURTAL
Free: M.S. Schad
VF: S. Harris
Gen Mgr: J.L. Schad
Sec: Grace Schad
Geol: J.L. Schad
MINE, 2 1/2 mi SE of Portal,
under ground, Big23
Under devel

BLACK, W L.
Bux 1028
SO & SO MINE, 15 mi S of Globe,
underground, Ag, Fb
Hibber deval

BLACK CANYON COPPER CO INC Box 1531, Fhoenix Pres: J W England, Jr VP: derome Kaye Sec-Tress: Ben Silverman KAY COPPER MINE, Recksprings, underground shaft, Cu, Zo, Au, Ag Mile (Leased by Chieftain Ming Corpl

BLACK CHIEF MINE
Bouse
Owner: D C Townsend
Ms
(Lessed to McElvaney & Harriman)

BLACK MESA CLAIM Box 1685, Yuma Lessee: Alan C Madden MINE, Yuma Co, Cu

BLACK PEARL MNG CO
Box 248, Bagdad
Pres & Gen Mgr: E A Schois
Owners: L K Lindahl, E A Schois, &
J H Casier
BLACK PEARL MINE, W ms ME of
Begdad, underground, WG3
Frod: 40 tuns
Mine Supt: K K Puumala
50-TON GRAV M&LL

BLACK QUEEN MINE. Aguila Mgr: Fred Soifesh MINE, Maricopa Co, Mn

BLOO NELLEY (UNIDA) Box 458, Wickenburg Opr: N S Oberan Mine, Yavapai Ce, Cu

BLUEJAY, WEST COAST, GOODLUCK & JUDGE MINES Bos 5, Cherry via Dewey Owners: Thomas Sutchiff & Robert Ayres MINES, Yawapos Co, Ca Under stavel

BOMBOY GROUP Box 264, Superior MINE, Pinel Co. Au. Ag. Cu

BONANZA MINE
Washington Camp
Mgr. C S Elayer
MINE in Santa Crus Co, Zn, Pb, Ag

BONANZA MNG CO Wenden Proe & Gen Mgr: H Ray Tohin VP: Joseph S Jenckes & W M Swisher Sec: Jack E Brown BONANZA MINE, 8 mi N of Wenden, underground, Cu, As Supt: Floyd Brown Under devel 50-TON GRAV MILL Idle

BOSLEY MNG CC

NEW Dale, Flagstaff
Pres & Gen Mgr: HV Booley
VP: J C Booley
VP: J C Booley
LENNISON MINE, Long Valley, 80 ml
5 of Flagstaff, underground, surface,
placer, Mn
Prod: 10 tons
Mine Supt: J C Booley

BOSTON MINE Skull Valley Mgr: John M Johnson MINE in Yavapai Co, Ca, Pb, Za

BOTT, GEORGE H
BOX 56, Wilcox
BOTT MINES, Aravaipa dist,
Klondyle, Zn. Pb., Ag. Au
litte

BOYD & FORTNER Wickenburg Partners: Berty Boyd & B H Fortne LUCKY MICA #1 MINE, 11 mi S of Wickenburg, spodumene, legidalite

BROWN, R L Boa 1783, Megales KANSAS MENE, Wash Camp, 20 mf 8 of Patagonia, underground, surface Prof: 15 tons Sept: Alex De La Ossa Engr: J Nunes

BUCKEYE MICA CO
Box 416, Buckeye
Pres & Gen Mgr: IT G Smith, Sr
VF: H G Smith, Jr
Sec: W Penkoche
BUCKEYE GROUP, 3 1/2 ms S ef
BUCKEYE GROUP, 3 1/2 ms S ef
BUCKEYE, waderground, Rica (Moscovite), Sericite, Be, Feldener
Prod: 100 tons
Supi: A Duncan
Asst Sept: C Murphy
Foreman: C V Hill
LUCKY CHANCE 1-2-5, 5 ms W ef
Quartswite, Sericite
Prod: 25 tons
Under devet
100-TON DRY & WET GRINDING
MILL
Supi: J G Smith, Jr
Foreman: Wayne Watts

BULLARD GROUP
Bos 131, Congress
Owner, Builard Estate
e/o Charles O Mathaws, Mgr
MBRR, Yavapai Co, Au, Ce
(Leased to Robler & Freezes,
Box 703, Wettenburg)

BURNEY MINES, INC 2422 W Balloca Ave, Tuccom Pres & Gen Mgr. R A Burney Sec-Trees: Lilla Burney STUVE LED & AMPITHEATEN MINES, underground, surface PLOT MILL

BY CHANCE MINE c/o Col Frank Chinds, Ajo Opr: Von R Calloway MINE, Pima Co, Ag, Cu

C & B MINE 2433 W Bottont Ave, Phoenix Opr: C P Moores MINE, Gila Co, Ag. Pb, Zn Lille

C A R MINES, INC
How 1851
Pres: S H Reither
VP & Gen Mgr: A W Smith
DELA FOUNTAINE & CUPID MINES,
Lui Ne of Kingman, underground,
Po, Zn, Ag, &u, Ge

CACTUS MLNG CQ
4215 Allott Ave, Sherman Qake,
Calif
Pras: B J Colvin
Gen Mgr: E A Sissinbachéd
Aast Mgr: J Burbridge
SUNSHINE MINE, 38 mi SW ef Tacson,
underground, Fp. Ag, Au
25-TOM DAY COMC MILL

CACTUS MINES 706 16th St, Douglas Owners: K.C. Moon & A.J. Sutchinson CACTUS & IRISH BOY MINES Swiesim Mts. 20 mi N of Douglas, underground, Pb, Ag

ARI MNG CO CALLARI MNG CO
406 Kress Bldg,
Long Beach 13, Calif
Pres & Gen Mgr: L F Albrecht
Sec: C M Smith
Gen Supe: V H LeMay
RUTH MINE, Box 941, Prescott,
e mis of Prescott, underground,
Zn, Ph, Cu, Ag, Au

CALIF STEEL PROD CO Richmons, Calif Treas: C F Fannia SILVER BELL OF COLUMBIA MINES, Pinal Co, Pb (Leaced to United Aris Mines)

CARLOTA COPPER CO CARLOTA COPPER CO \$30 W Lashum, Phowenia Pres & Gen Mgr: John L Alexand CARLOTA MINE, 15 ms W of Mian eurface, Cu Idis

CASH MINE Mgr: Jack Orr MINE in Yavapai Co, Au, Ag, Cu, Pb, Zn

CAZIER, J N & SCHOLZ, E A Bugdad COPPER KING MINE, 7 mi 8 of Bagdad, underground, Zn, Cu linder devel

CEDAR TALISMAN CONS MNG CO 300 Wilshire Dr., Phoenix Pros & Gen Mgr: J Walters, Jr PRENCH LILY MINE, Cleator, underground, Au, Ag, Cu, Zn, Pb 60-TON PLOT MILL

CENTURION MINE 2112 W Adams St. Phoenis Owner: S Jane Landfair MINE, Cochise Co, Ag, Cu, Zn Under devet (Leased to Golden Gate Mng Co)

CHAPMAN, HARRY ALLEN PO Bon 840, Tucson Gen Mgr & Gool: Cordy C Calvin BLACK CHIEF MINE, 65 mi 8W of Tucson, underground, diamond cor Tucson, underground, diamond co-drilling (4 claims), Mn GOLD BULLION GP, 87 mi SW of Tucson, dewatering & sampling, Au, Ag, Fo, Cu, Mo, WO3

CHEMI-COTE PERLITE CORP. CHEMI-COTE PERLITE CO Bus Mid. Phonnis or Box 484, Dallas, Texas Pres & Gen Mgr: O T Ball VP: L L Young See: Mrs Pay Young MacDonald Gen Supt & Mech Engr: Travie P MARY T & SANDY #2 MINES, 3 mi SW of Superior, surface, perlite

CHILITO MINE GROUP Bor 1005, Hayden Owner: B C Velasco MINE, Gila Co, Cu

CHILSON MINES
Box 2726, Tucson
Mgr: Richard E Chilson
Mgr: Richard E Chilson
MINO-IN-INCILE MINE, 10 mi E of
Sahuarita, underground, Cu, Ag
Prod: 600 tone per month
Mine Supt: Lauren Van Horn

COBRA CHEMICAL CO, INC 106 N Cortex St. Prescott Pres: PD Hosse VP: N M Hosse COBRA & McMAHON GPS, 27 mi S of Prescott, surface, Cu Under devei MI ES, Yevapai Co, Cu Under devei

COLBURN, B A JR
Box 153, Congress
CONGRESS MINE, 3 mi N of
Congress Jt, underground, Au, Ag, W

COLORADO RIVER PLACER
Box 1558, Globe
Opr: Irving Rose
MiNE, Yuma Co, Au

COMSTOCK EXT MNG CO 408 N 7th Ave, Phoenix Pres: John Evens See: B T Dick DOUGHBOY GP MINE, Gila Co, Cu, Za Supt: Tony Trojanovich Engr: Henry Nichols

COMS FELDSPAR CORP (See Internat'l Min & Chem Corp) Box 230, Kingman Gen Mgr. E Koenig OPEN PIT MINE, feldspar, silica OPEN PIT MINE, feldspar, silici 80-TON GRINDING PL Supt: L D Gregory Poremes: Paul Hodges & S B Wo Assay: E W Koenig Purch Agt: Paul Willie

CONSOL TUNGSTEN MINES. Hugdad Mgr: J M Cobb MiNE in Yavapai Co, W

COPPER BUTTE MNG CO Box N. Ray Mgr: C F Mitcheil COPPER BUTTE MINE, 7 mi W of Ray, surface, Cu

CORPER CAP MNG CO Wickenburg MINE, Yavapai Co, Cu

COPPER CITIES MNG CO (wholly-owned subsidiary of Miami Copper Co) Box 100, Miami Mng: R W Hughes MINE, 3 mi N of Miami, surface, Cu Supt: John Gray Engr: C B Hostetler 12,000-TON FLOT MILL

COPPER CREEK CONS MNG CO 95 Camino Espanol, Tucson Pres: M J Elsing VP: James S Douglas Gen Supt: L C Vought OLD RELIABLE, 12 mi E of Mam 125-TON PLOT MILL

COPPER CROWN MINE KERMENG OWN MINE
KERMENG OWNER: John L Solomon
MINE, IO mi SE of Kirkland, underground, Cu, Au, Ag
Prod: IO tone
Mine Supt: John L Solomon
Linder daysh

COPPER HILL MNG CO DO PER HILL MAG CO
Pres: TR Black, Box 46,
Tipp City, Ohio
See & Gen Mgr: L.O Goodman
SUPERIOR & BOSTON MINES, 4 mi
NE of Globe, underground, Mn, Cu

COPPER MT MINE 172 S 3rd St, St George, Utah Opr: J E Wulfenstein MINE, Mohave Co, Cu

CORONADO COPPER & ZINC CO 1200 Pacific Mutual Bidg. Loc Angeles 14, Calif
Pres & Gen Mgr: George D Dub
VP: Bleir W Stewart
Sec: A L Davidson
Geol: K K Welker
Purch Agt: A L Davidson
JOHNSON CAMP MINE, 3 mi JOHNSON CAMP MINE, 3 mi NW of Dragoon Supt: Fred E Gray Foreman: Maxwelb Daugherty Engr: JO Sierakoeki MOORE & REFUBLIC MINES, 6 mi N of Dragoon, underground, Cu, Zn 200-TON PLOT MILL, Johnson Camp Supt: L D Yundt

CORONADO MINES, INC RED MT, BUENA VISTA, GOLDEN ROSE & WASHINOTON MINES, BOX 689, Nogates underground, Cu, Me, W, Pb, An, Ag, pyrites

CORONATION MNO CO, INC Box 387, Bouse Pres & Gen Mgr. Charles Milton VP: L A Linebaugh Sec-Treas: M S Schneider CORONATION MINES 81-74,

CROWN ASBESTOS MINES.

ANC
Box 1443, Globe
Pres: JE Talbot
VP 4 Gen Mgr. Fred W Kreider
See: Harry Ditmore
See: Asthur R Still Geol: Arthur R Still MINE, 55 mi NE of Globe, underground, stripping, asbestos (chryso-tile soft) Sup: Fred W Kreider Under devel 10-TON ASBESTOG MILL under

CROWN PT MNG CO
Box 691, Globe
Pres & Gen Mgr: C F Moores
RAY MINE, 35 m i SW of Globe,
underground, Pb. Ag
Engr: R E Douglas
FLOT GRAY MILL
(Lessed to G R French)

Supt: Grady B Gulledge

CUPEL MINE (See C A R Mines, Inc) Box 1053, Kingman MINE, Mohave Co, Ag, Pb

DETROIT MINE GP Kingman Owner: I M George Lessees: K N Hart & Adrion MINE, Mohave Co, Ag, Cu

DRAGGON ZINC MINE Owners: Flora C Hubbard, 1201 St Mary's Rd, Tecson & Mrs W G Swert, 1712 High St, Alamede, Calif MINE, Cochise Co, Zn (Leased to C B Higgins, Box 156, Benson)

DUNCAN, WALTER MNG CO Box 1488, Cortes, Colo Pres. J Walter Duncan, Jr Gen Mgr: Charles R Butler CISCO MINE, Lukaclukai Mie, Apache Co, 53 mi Sw of Shiprock, NM, underground, U, V Prod: 35 tons Supt: Orral Jahnke

DUTCH PLAT GP Yucca Owners: Birt J Jackson & Buean Vaal'dween MINE, Mohave Co, W Under devel

DYE & BATHRICK DYE & BATHRICK
Bos 1069, Kingman
Gen Mgr: R L Dye
Asst Gen Mgr: J H Bathrick
BORIANA MINE, Yucca, 18 mi
NE of Yucca, dumps, WO3, Cu, Ag
Prod: 130 ones
(Underground leased to J A Allen
& Dan K Harper, Kingman)
COPPER WORLD MINE, Yucca,
Ag Zo C. Ph.

Ag. Ze, Cu, Pb (Leased to Mt States Ming Co) 150-TON GRAV-FLOT MILL, Bortana Mill Supt: R L Dys Asst Supt & Foreman: C C Strouse

EAGLE-PICHER CO, THE MNG & SMELTING DIV VP & Gen Mgr: Elmer Isern WESTERN OPR: Box 23, Tuccon Mgr: Grover J Duff SAN XAVER MINE, 30 ml S of Tuccon, underground, Pb, Zn, Cu, Ag

EMFEROR-DUCHESS
MINES CO, INC
Pairfield, idaho
Pres: Ben Lasswell
VP: Chas Puller
Sec Treas: Roland Baldwin
Dir: Laurence Green, Sella
MINE at Sella, Cu, Ag
Supt: Myrl Green

PELDSPAR MINE Kingman Mgr: Amos Hodges MINE in Mohave Co, feldspar

c/o Ralph P Smith, Hollen Hotel, Lordsburg, New Mex BLUE MT MINE, ar Portal, Pb

GALLAGHER VANADIUM & RARE MINERALS CORP
BOX 71, Tombstone
Mgr: JB Gallagher
BRONKOW MINE, near Tombstone,
underground, Pb, Au, Ag
(Leased to Yogel Mag Co)

GIACOMA BROS Box 546, Tombete Mgr: A P Giacoma COSTELLO GP, Au

GIL-TED MNG CO Aguila Mgr: V D Standley MINE in Maricopa Co, Mn.

GLOBE-MIAMI COPPER ZINC CORP 810 Heard Bldg, Phoenix Pres: James U Fagan Soc-Tress: Russell A Wright Gen Supt: Reed E Roberts IRENE MINE, 2 mt N of Globe, underground Ein

GOLD NUGGET MINE Box 784, Mess. Opr: Kenneth W Hebnes MINE, Maricopa Co, Au

GOLDEN CROWN MNG CO Crown King
Pres & Gen Mgr: Raiph O Brown
COUGAR, LYDIA & TIGER MINES,
underground, Pb, Za, Cu, Ag, Au
Supt: R M King BROWN GP, c/o Arthur Still, Box 1513, Prescott, Au, Ag, Pb, Zn

GOLDEN GATE TRUST & MNG CO Box 450, Wickenburg Pree: N S Oberan GOLDEN GATE & PRANKLIN D MINES, Yavapai Co, Cu

GOLDFIELD MINES, INC Ness
Owner: Hugh Nichols
Mgr: TR Russell
GOLDFIELD MINE, NE of Mess, eurface, 'Au 125-TON CYANIDE MILL (Leased to Hebner & Le

GOMEZ, CY & MANUEL Marenci BELL GROUP, Greenlee Co, Au, Ag (Leased from Dover Copper Co)

GOOD ENOUGH MNG & MLNG
650 S 4th Ave, Tucson
Pres: Guido A Allorandini
Sec & Purch Agt: J Arthur Zappis
GOOD ENOUGH MINE, Las Guijas
Mng dist, 10 mi N of Arivaca,
underground, WO3
Pred: 10 tons
50-TON GRAV MILL

Box 1822, Prescott
SHELDON SUPERIOR MINE, 14 mi
SE of Prescott, Yavapai, Co, Cu, Pb,
Za, Ag, Au, shipping
15ec Calif)

GRACE MINES Portal
Pres: M E Schad
VP: Archie Spain
Opr: J L Schad
GRACE MINES, underground

GRAND REEF MINE
Box 6, Yucca
Owmer: A E Knowland
MINE, 39 mi S of Yucca, underground,
CaF₂, Fb, V, Au

GRANNIS, PRANK & PATTERSON, C G Chloride ATWATER KENT GP, Zn. Pb

GREEN STREAK MINE Owner: R L Fleming, Bouse Opr: L A Aplington MINE, Yuma Co, Au, Ag, Cu

GRIPPITH, DEN Yucca McCRAKEN MT GP, 67 mi SE of Kingman, underground, Pb, Ag 60-TON GRAV FLOT MILL, Signal

MINING WORLD

GRISSOMS INC Winkleman Mgr: M C Grissom MINE in Gila Co, Pb Lille

H & H MINING CO Yucca Gen Mgr: Earl Heath MARY NEVADA MINE, underground, Ag, Pb, Au Foreman, Sheldon Heath 40-YD GRAV OPR

H & M MINING CO Crown King Partners: C F Moores, F G Hotmas GLADIATOR MINE, 3 mi N of Crown King, underground, Au, Ag, Cu, Pb, Zn Foreman: Harrison 20-TON FLOT MILL on Smith

HAGEY, JH & JD Box 205, Chieride J& JCLAIMS, 10 mi E of Caloride underground, Au, Ag, Zn, Pe, Cu Idie D & H GP, 10 mi E of Chioride. Zn, Pb, Ag, Au, Cu, Mn

HAPPY JEAN OF Boune Opr. D T Roberts Owner: George Bermardie MINE, Yuma Co, Au, Ag, Cu

HELVETIA MNG CO Box 926, Tucson Owner: R B Blankenskip 42 CLAIMS, underground & surface, pit, Ag. Cu, W. Mo, dev CLD DKR MINE (Leased to R E Chileon)

HENDERSON, MRS A S Box 27, Patagonia
MINERAL MINE, 12 mi N of
Patagonia, underground, Pb, Ea, Ag, Cu (Leased to R G Mores STAR #1, 2 7 3 MINES, 12 mi N of Patagonia, surface, Ma Idle

HIGGINS, F L Box 171, Willcom SCENICA MINE or Cochine Stronghold, underground, Au, Pb, Ag, Cu, Zn

HIGH HILL #1-6 Box 102, Sahuarita Opr: C D Wilson MINE, Pima Co, Au, Ag, Cu, Pb

HILL, PRANK & EDWARDS, GEORGE BOX SA, Ruby Star Rt, Tocson DOCTOWN MINE, 22 ms SW of Tucson, underground Ag, Pb, Za

HILLSIDE MNG & MLG CO HILLSIDE MNG & MLG CO Bagtad
Pres: JC Lincoln
VP & Gen Mgr: Erneet R Dickie
Asst Gen Mgr: EG Green
Sec: George & Colville
Gen Supt & Metal: Roseo Duncan
Mech Engr: R C Begart
HILLSIDE MNEE, 10 mi N of Bagdad,
underground, W, idle
TUNGSTONA MINE, 12 mi N of
Bagdad, underground, W
Under deveil
Prod: 150 tone Prod: 150 tone
Mine Supt: Edward Chenard
Mine Engr: R C Bogart
300-TON GRAV-FLOT MILL Mill Supt: Rosco Duncan Mill Foreman: B L Solper Assayer: J B Campbell

HILTON, E P
Box 1308, Tucson
STATE O' MAINE & LONE MT MINES,
36 mi E of Tucson, underground, Pb, Ag, Au, Zn Supt: E P Hilton

HOLLAND MINES Washington Camp Mgr: E W McFarland MINES in Santa Crus Co, Pb, Zn, Cu HOLMESTAKE MNG CO Box 308, Winterhaven, Calif SONORA GROUP, Yuma Co, Pb, Ag (See Calif)

HOLY CROSS MINE 1302 Casa Grande Rd, Tucgon Opr: Tom D Callas, Oracle MINE, Pinal Co, Ag, Cu

HOOPES & CO Mgr: K L Hoopes MINE, MILL in Gila Co, limestone

HULL MINE, CHIEF OF THE DOME, CASTLE DOME, DIANA Box 1310, Yuma Owner: JS Mahood MINES, Yuma Co, Ag, Pb

INDIAN SPRINGS MINE Box 1005, Globe
Gen Mgr: H R Scott
Sec: R D Mich
Geol: William A Scott
Purch Agt: H R Scott
MINE, 14 mi S of Globe, underground, asbestos Mine Engr: Under devel

INSPIRATION CONSOL COPPER CO Inspiration
Gen Magr: P D I Honeyman
Asst Gen Magr: N C Weed
Asst: C G Stuns
Personnel Dir L E Caldwell
Geol: E F Reed
Mech Engr: A H Neal
Safety Engr: C O Cunningham
Asst Purch Agi: E P Dolin
INSPIRATION MINE, Inspiration,
underground, surface. Ca
Prod: 13, 000
Mine Supt: J R Watts
Asst Supt: B B Whitney
Open Pit Foreman: T E Bilson
Underground Foreman: M R Flai Open Pit Foreman: T E Biseon Underground Foreman: M R Flais Engr: C D Huffine FLOT-MILL, Inspiration Supt: H F Adams Foreman: S E McNett LEACHING PLANT Supt: C B Kettering Gen Foreman W D Schrader REFINERY Supt: C B Kettering
Asst Supt: W D Schrader
(See East)

INTERNTL MIN & CHEM CORP (See Consol Feldspar) (See Calif, Colo, Mont, New Mex, So Dak, Wyo Central, South & East)

INTERNATL MNG EXCH c/o J B Johnson Jr, Box 418 Clendale MYSTERY MINE, Yavapai Co GOLDEN ANCHOR GP

INTERNATE SMELTING & Supt: Harold Faord Ore Buyer: Clifton E Smith 3,000-TON CUSTOM Cu SMELTER

ISBELL CONST CO Mgr: RS isbell SILVER BELL MINE, Silver Bell, Pima Co, Cu

JAQUAYS MNG CORP 1219 S 19th Ave, Phoenix Pres & Gen Mgr: D W Jaquays Pres & Gen Mgr: D W Jaquay YP: G A Jaquays Sec: Ethelyn Jaquays Asst Gen Mgr: Leroy Wood Gen Supt: Alvin Gerhardt REGAL & CANADIAN MINES, Box 328, Globs, 47 mi N of Clobs. underground, asheates Globe, underground, asbestos Frod: 50 tons Mine Supt: F H Padgett 20-TON GRAV MILL

JOHNSON MNG CO
55 N Matlock St, Mesa
Mgg: A H Johnson
RARE METALS MOLY MINE &
BLACK COPPER GP, 4 ml W of
Kelvin, underground, Cu, Au, Ag
Under devel

RAY MINES DIV
Ray
Gen Mgr: A P Morris
Asst Gen Mgr: B J O'Carroll
Div Dontroller: C L Billing
Purch Agt: N E Guyer
RAY MINES, 80 mi SE of Phoenix,
pit & underground, surface, Cu
Prod: 15,000 tons
Gen Mine Supt: J C Van De Water
Asst Fit Supt: B C Lansing
Asst Supt. Undergrd Mine:
A B Bobb
Asst Much Supt: A L Dickerson A 8 Bottle
Asst Mech Supt: A L Dickerson
Chief Engr: C L Hoyt
Chief Elec: L J Miller
Gen Surf Foreman: J F Patton Gen Mine Foreman, Underground:

KENNECOTT COPPER CORP

Gen Mine Foreman, Underground:
TR Spargo
Stope Engr: K W Foote
Safety Engr: Max Shake
Safety Engr: Max Shake
15,000-TON FLOT MILL, Hayden,
23 mt SE of Ray
Mill Supt: G P Sewell
Mill Foremen: W H Steinke,
S E Meyer, F A Meyer
Metal: D V Gabbat
Assayers: S Quesada, R Monroy
Plant Engr: R C Johnson
Master Mach: P M Hoskins
Chief Elec: C C Fanning
(See Nev, New Max, Utah & East) (See Nev, New Mex, Utah & East)

KING, OLD DICK & SOUTHERN CROSS MINES Sabuarita Mgr: R E Chilson MINES in Pima Co, Cu

KNOX ARIZ COPPER MNG 468 Laurel St. St Louis 13, Mo 408 Laurel St, St Louis 12, Mo Pres & Gen Mgr: W A Knox, Sr VP: Noien McLean Sec: W A Knox, Jr Geol: Jack A James COPPER MT MINE, Ajo, 25 mi SE of Ajo, underground, Cu, Au, Ag Under devel

LEAD & ZINC CORP OF Box 606, Globe Pres: Grady B Gulledge VP: J B Williamson Gen Mgr: Ray Pointer BEN HUR MINE, 15 mi NW of Klondyke, underground. Pb, Zn, Cu, Ag

LEON, MILTON
208 Wright Bldg, Tulsa 3, Okla
UNCLE SAM MINE, Box 859,
Nogales, 5 mi NE of Nogales,
underground, Au, Ag, Pb
Under devel

LOBB, GEORGE N Box 246, Superior MINES, Pinal Co, Cu RANDOLPH #1-13 CLAIMS, 12 mi

LONE STAR MINES, INC 702 loth Ave, Safford Pres: J P Merrill VP: Albert Spalding Sec: Paul Merrill LONE STAR MINE, 10 mi NE

LUCKY SWEDE MNG CLAIM Box 2231, Warren CLAIM, 6 mi E of Lowell,

MACCO CORP, BARITE DIV 14409 S Paramount Bivd, 14409 S Paramount Blyd,
Paramount, Calif
Pres: John MacLeod
Div Mgr: John Robinson
Gen Suph: Win Paine
Purch Agt: Neil Giebler
GRANITE REEF MINE, P O Box 926,
Mesa, 20 mi E of Mesa, underground, Burite Mine Supt: Clark Everett Prod: 150 tons 150-TON PLOT MILL Mill Supt: Larry Mathie Assay: Tom Clay

MAGIC MINE Oprs: E J Johnson, T E Warren MAGMA COPPER CO
Box 37, Superior
Pres: A J McNab
VP & Gen Mgr: W P Goss
Assi Gen Mgr: Darrell Gardner
VP & Tress: H E Dodge
Sec. Roy Royskyske Aest Gen Mgr: Darrell Gardner
VP & Treas: H E Dodge
Sec: Roy Bonebrake
Metal: A A Wallach
Geol: Hugh Steele
Mech Engr: Dave Orr
Elec Engr: Dave Orr
Elec Engr: T P Trask
Purch Agi: R L Nedlock
Auditor: W J Swanson
MAGMA MINE, N of Superior
underground, Cu, Ag, Au
Pred: 1,000 tons
Mine Supt: C B Foraker
Aest Mine Supt: John Draeger
Mine Foreman: Cecll Tomerlin
Mine Engr: J F Flanagan
1,500-TON FLOT MILL, Superior
Mill Foreman. John Fry
Assay: W W Simon
24,000-TON REVERB SMELTER,
Superior 24, 000-Superior Supt: E J Caldwell Aset Supt: Claude Soule

MAGMA KING MANGANESE MINE Superior MINE in Pinal Co, Mm, Ag Mgr: Ralph Pomeroy

MANGANESE KING MNG SYN Box 135, Bouse Pres: R N Doyle VP & Sec: Harrison Doyle Oen Mgr: L A Aplington MANGANESE KING MINE, 35 mi NE of Bouse, surface Under devel

MANHATTAN CONSOL MINES MANHATTAN CONSOL & DEV CO
Box 351, Tonopah, Nevada Pres: J Fred McColloch Sec: Nick J Barbarich SCRIBNER MINE, Box 101, Elfrida, 26 mi NW of Elfrida underground, Pb. Ag. Au Under devel Mine Sunt: John W Pursley Mine Sunt: John W Pursley Under devel
Mine Supt; John W Pureley
OLD DICK MINE, Bagdad, 3 mi S
of Bagdad, underground, Zn, Cu, Ag, Pb
Prod: 100 tons
Under devel
Mine Supt; K L Erickson
Mine Foreman: Pat E Sayre
(See Newsday) (See Nevada)

MC FARLAND & HULLINGER CO
Bagdad
Owners: FG McFarland & S R Owners: FG McFarland & S R Hullinger, Box 238, Tooele, Utah OLD DICK MINE, Begdad, Zn, Cu, Ph Prod: 2,000 tons momthly Mgr: K L Erickeon BOSTON-ARIZ MINE, near Skull Valley, Cu, Pb, Zn (Leased to McFarland & Hullinger)

(See Utah)

METATE ASBESTOS CORP Box 51, Joplin, Mo Pres: Charles Robert Neal Pres: Charles Robert Neal
VP & Gen Mgr: Jack L Neal
Asst Gen Mgr: Charles Rose Neal
Sec: R C McNabb
Furch Agt: Jack L Neal
APACHE MINE, Box 1506, Globe, 16 mi NE of Globe, underground, inheritos
Prod: 5 tons
Mine Supt: Jack L Neal
Mine Foreman: Ira Talley
MiLL, 8 tons cobbed ore per day
Mill Supt: Charles Ross Neal
CHIRICAHUA GP, San Carlos

MIAMI COPPER CO MIAMI COPPER CO
Box 100, Miami
Gen Mgr: R W Hughes
Asst Gen Mgr: B R Coil
Gen Supt: J W Still
Metal: C H Curtis Metal: C H Curtis
Elee Engr. A T Netterblad
Geoi: W W Simmons
Mech Engr. J J Luchesea
Safety Engr. W R Collier
Purch Agi: F L Bishop
MiA Mi Mine, Miami, underground,
C. M. MIAMI MERCE, MIAME, MIAME CU, MO Prod: 13,000 tons
Mine Supt: W F Dietler
Mine Foreman: E C Williams
Mine Engr: J B Fletcher

'18,000-TON PLOT MELL Mill Supis J W Smith Assayer: G R Warren (See East)

MIDNIGHT & MIDNIGHT EXT #1 MINES Box 1022, Nogales Owners: Val & Margaret Cason MINES, Sente Crus Co, Ag. Pb 131s

MINERAL MY M & M CO 330 E 14th 54, Tempe Press C M Miller VP & Gen Magr: LL Boyer OGRHAM-IALL GP, 26 and 3W of Superior, Pb, Ag. Za, underground de WOGDPECKER MINE, Pinal Co, Au, Ag, Pb, der SILVER QUEEN GP, 23 mk SW of Superior, Pb, Ag Lite

MONSCA GROUP
Box 27, Yarnell
Owners: C D Howe, Jame L Riggine,
L J Jaylou
MINE, Yevapai Co, Au

MONTANA-ARIZONA MNG CO Gila Bend Cu, Ag Mgr: Ch A Anderson, Lubeville

MORENO, RAMON & Box 053, Patagonia MINERAL WEST MINE, 14 ms NW of Patagonia, underground, Ag, Zn, Cu

MORNING STAR #1-4 327 S Pleasant St, Prescott Owner: Charles L Felippi PROSPECT, 8 mi S of Prescott Little

MT STATES METALS CO Tucca Pres & Gen Mgr. G & Freeman COPPER WORLD MINE, is rai WE of Yucca, underground, Cu, Za COPPER WORLD MILL, 75 tons (Leased from Dye & Bathrick)

WASH MINES
Owner: Jus P Nach, Nash Bidg,
Austin, Texas
Gen Mgr: D C Gilbert
BONANZA MillSE, Duquesne,
Patagonia dies, Cu
(Lessed to Elayer & Co)
Presd: 35 teom
MAINE MINE, Duquesne, Patagonia
dist, Cu
iLessed to Faul L Hanter;
Budder dervol
MOLLAND, KANSAS, ESTELIA MINES,
Duquesne, Patagonia diet, Zm
Illis

NAVAJO URANIUM COBox 808, Certes, CeloPres: R O Dulaney, Jr
VP & Gen Mgr. G R Kennedy
Set Troae: Edmund Key III
Met: Oucar Pischer
COVE MINES, Annche Co,
underground, surface, U, V
Prod. 80 tons
Supt: Wilbur Jannacha
Foreman: W H Peters
Engr: Tom Valente
Shift Bose: Chris H Johes
SAMPLDHO PL, Shiprock, H M
Prod. 309 tons

NEW LONDON, STORM
CLOUD, ORIO AND
BENTUN MINES
cfo Clayton Straub, 1076
Subway Term Bidg,
Loe Angelee 13, Calif
Lessees: K. N Hart, H. M. Hansen
A. Adricon Shirner
MINE, Mohave Co., Ag., Pb., Za.
Idle

BIKAS MHG CO . Oracle Mgr: Harry E Krumlung MINE in Plant Co, W

OLD DOMINION GREY GP Bow 100, Miami Owner: Miami Copper Co MINE, Gile Co, Cu ORO BLANCO MINES BOX 64, Ruby Star Rt, Tunden Gen Mgr. 7 J. Anderson ORO BLANCO MMR. 75 ms 5 of Tuccom, undergrown, Am, Ag 30-TOS GRAV MILL, Sents Crus Co Bits.

ORO FLAME MMG CO 202 N Pleasant St, Present May: 18 K Grove ONG FLAME & OMO MANES, Yavapai Ce underground, Au, Ag, Pb Eine

ORR & DICKIE
Rt I, Box 300, Prescott
Fartners, JA

ORR & DICKIE
Rtl, Ecs 200, Prescots
Partners: Jack Orr & E R Dickie
CASH MENE, 12 md S of Proscots,
Au, Ag, Cu, Pb, Zs
Elle
SENATOR GP, Yavapak Co, Ag, Cu
(Leaced from Phelop Budge Corp)

OSBORDE, BARRY M PRESS: SUE MINE, 5 mi N of Parker underground, Au, Cu 7-TON MELL.

PAUL LAME PLANT
Paul Spur
Pres & Gen Mgr. Affred Puul, Jr
Asst Mgr & Supt. John Van Houten
Purch Agt. Robert Smith
MinEr, It ms W of Douglas,
Ilme rock
Frest 500 inne
LIME Nights, rotary bline, crushing
& grinding and acreeming plant

PHELPS DODGE CORP

Douglas
WENTERN GEN OFFICIB
Gen Mgr: C R Kurell
Ast Gen Mgr: W C Lawon,
J B Pulles
Office Mgr: H E Mosere
Dir, Labor Reh: W J Uren
Chief Engr: H V Krusie
Geophys Renearch: E E Mailiet
Gen Assi: Jahn Kinhs
Asst Gen Pur Agr: K a Ables
West Traffic Agt: A C Becon
MORENCI BR, Morenci, mines,
concentrator & smelter
Mgr: L M Barker
Oen Supi: W E Fensi
NEW CORNELIA HR, Ajo, mines,
concentrator & smelter
Mgr: A T Barr
COPPER QUEEN BR, Bisbes, mines
Mgr: C E Mille
Supi: W F Crasford
DOUGLAS REDUC WES, Douglas,
concentrator & smelter
Mgr: E Mille
Supi: BG Fowler
PHELPS DODGE MERC CO, eteres
at Bisbes, Clifton, Douglas, Morenci
Mgr: B W Hagan, Douglas
NEW CORNELIA COOP MERC CO,
store at Ajo
Mgr: B W Hagan, Douglas
(See New Mex, Tex, East)

PHILLIPS ASBESTOS MINE Globs Mgr: Guy Phillips MINE in Gila Co, asbestos

PIED MONT MINES, INC PORTAL Gen May: L K Diffenderfor HILLTOP MINE, underground, Pb, Zn HILLTOP MILL (Leased to Amer Sine, Lead & Smelting Co)

PIMA MHG CO
Bos 7187, Tucson
Pres. Herbert Hoover, Jr
VP: EA Peleconjeer
Gen Mgr: ED Spaulding
Sec: EW Cairne
Gen Supt. R E Thurmond
PIMA MINE, 20 mi SW of Tucson,
underground, Cu
Mine Supt: R E Thurmond
Forerman. Docald Weierman
Prod: 150 tons
Under devent

PIMA BOCK & SAND Ajo Way, Tucson Free: KD Lieberman Engr: Louis Green LOUDON MINE, 14 mi E of Sahuarita, addt, Cu ELGIN MINE, Cu

PINAL & ASTEX e/o Joseph E Valentine, Box 1452, Miams Opr: Valentine & Bustamonte MINE, Gila Co, Ag. Pb, Za

PINE TOP ASBESTOS MINES Bere Mer, Clade Owner: Grady B Gulledge FINE TOP ASBESTOS MINE, 40 ml NE of Globe, underground, asbestos Müne Supt: J B Wilkarmeen

PRUDENTIAL MINES
Yuma Co
Engr: Charles Milton, 2549 FSt,
San Diego, Calif
(See Calif)

RAY LEAD SILVER MINE Globe Mgr: Charles Moores MINE in Pinal Co, Pb, Ag

REBEL MINE Frankolds Mgr: Bill Snyder MINE in Yavapai Co, Pb, Zn, Au, Ag, Cu

RED BLUFF MINE Gisin Mgr: Karl Larsen MiNE in Gila Co, U

RED CLOUD GP
Owners: M. L. Lynch, John W
Laivier, Prescott
Lesces: E. R. Dickie, Bagdad
MINE, S. emi SW of Bagdad, diamend
drill explor
(Sub-leaced to Cyprus Mines Corp)

REED & REED
Rt 1, Box 123, Bishop, Calif
Gen Mgr: George F Reed
BANNER & FOUNTAINHEAD MINE,
14 mi N of Kingman, underground,
Zn, Ag, Au, Pb, Cu
Illis

REORG SILVER KING
DIVIDE MNG CO
Prescott
MT UNION MINE, 10 mi S of
Prescott, underground, Au, Ag. Pb., Za

REYMERT EXT SILVER (MINES)
BOS 521, Superior
Pres & Gen Mgr. Horman De Vaux
VP. Ray E Matzinger
Sec: Nell B McClinnic
Gen Sapt: Fred A Bennett
REYMERT MINE, 7 ml W of Superior,
Ag. explor drilling

REYNOLDS FALLS
ABBESTOS CO
BOX 1593, Clobe
Partners: George Kohl &
Charier Kohl
MINE, 55 ms N of Globe, under
ground, chrysolite, asbestos
Fred: 3-10 tons

RIO DEL MONTE MINES, INC Balome Pres & Gen Mgr: O K Gilliam VP: Emil Anderson Sec: E V Eckel RIO DEL MONTE MINE, 4 ml SW of Salome, underground, Au, Ag, Cu, Pb Doider devel GRAY MILL

RIVIERA MNG CO
Provenia
CHRISTMAN MINE, 9 md N of
Winkleman, underground, Cu
Prod. 50 lane

BAN MANUEL COPPER CORP
BOX 37, Superior
Press: A J McVab
VP & Gen Mgr: W P Goss
VP & Sec: Roy C Bonebrake
Elec Engr: R P Diehl
Mine Mgr: J F Buchanam
Geol: N J Stucle
Mech Engr: C A Bilson
Safety Engr: W W Savage
Purch Agt: J A Cardner
Plant Mgr & Dir of Engr: F N Buchella

SAN MIGUEL MINE, 42 md N of Tucson, underground, Cu, Me, As, Ag Mine Supt (development): C L Pilhar Foreman: H I Ashby Engr: C R Passavant, 20,000-TON FLOT MILL 140,000,000 LEE BEVERS SMELTER (anticipate)

SAN RAMON MINE

4834 E Brondway, Tucson
Owner: Beb Cruse
MINE, 16 mi NW of Patagonia,
underground, Pb, Cu, Ag. Zo
Prod: 2 tons

SANDERS MINE Sanders Mgr: C A McCarrett MINE in Apache Co, bestonite

SAUTA TEBESA MNG CO Befford Sec: Paul Merrill SANTA TERESA & FAIRVIEW MINES, Graham Co, Pb Idle

SCHEELY MHQ CO
Arisson
Pres: L. G Ferestrom
Sec: Fred Carlson
SCHEELY GP, 22 ms SW of Arivses,
underground, WQ2
Prod: 20 tons
Mine Supt: L. G Fernstrom
Foreman: Free Carlson
30-TON GRAV MILL

SEIN FEIN MMG CO Ricentifies Pres: Dean Nicholson MINE, Aravaipa dist, underground, surface, Au, Ag. Cu. Ph Supt: Raymond Pointer Engr: E Il Lundquist

SHANNOR MINE
Too lith St, Douglas
Owners: A J Butchinsen &
K C Mison
MINE, Glesson, 16 mi E of Tumbotune
underground, Zn, Fb, Cu, As, Ag

SHAPLEY PROCESSING CO (Div of Fluorspar Corp of Amer) 1498 E Town & Country Lame, Phoenia Pres: Cooper Shapley, 3r MINE, 32 ml SW of Aguila, underground, CaF₂

SHATTUCK DEMM MNG CORP (Iron King Brench)
IRON NISC MINE, Inschols, underground, Zn. Ph. Au, Ag
Prod: 500 tune
Mgr: If F Mills
Mine Supt: ER Tombineca
Chief Clerk: J W Speweright
500-TOR FLOT MILL
Mill Supt: Albert Pessin
(See East)

SHOEMAKER, JOHN & CARL Box 124, Present GOLD COIN GP, Yempsi 1de

SIERRITA MNG &
RANCHING CO.
Box 25, Ruby Star Rr, Tucson
Tress: Leander M Harris
GOLDEN FLEECE MINE;
Pima Co, Au
Under Sevel
COWBOY MINE; Pima Co, Ph, Ag,
Ee
Under deval
OLD FOWERS MINE; Pima Co, Cu

SILVER PLAKE MINE 306 Marma St, Prescott Owner: W.R. Pitagerald MINE, S. m. E of Prescott, underground Supt: J.R. Sanches

SILVER KNIGHT DEV CO LTD Box 2504, Phoenix Pres: Gus A McKnight SELVER KNIGHT MINE, Yavaqai Co, Ag, Po, Au, Es Uniter devel

SILVER QUEEN MNG CO 124 N 2nd Ave, Phoenix Sec-Trees: Floyd A Raine SILVER QUEEN \$1-4 MINES, Yavapai Co, Ag Islie

MINING WORLD

SILVER RESP MINE
Sex 432, Casa Grando
MINE, 13 mi S of Casa Grando,
underground, open pit, Ag
Litte
(Lessod to W L Clayton)

SNYDER MNG & MLG CO Box 41, Semoids Mgr: Phid Snyder Sec: Mrs Phid Snyder CONGLOMERATE, AURUM, EAGLE, A W A, REESE & 3, 3, MINES Pima Co, Pb

SOMIND MNG & MLG CORP Salome Pres & Gen Mgr: W T Zwer HARQUAHALA & ZAGLE MENES,

SOUTHERN CROSS MMG CORP Box 47, Quartrains Mgr: LA Aplington LUCKY LEAD 81-6, 18 us 3 of Bouse, underground, Pb, Zn, Ag, Au ids.

SOUTHWEST MINES CONTR CO Box 1041, Prescots Gen Mgr. Joe Ward GREAT SCOT MINE, 19 mi SE of Prescott, underground, Fb, En, An, Ag, Mn.

SPARKES, GRACE M Star Rt, Mereford Mgr. Perry L Bones STATE OF TEXAS MERE, Star Rt, Hereford, 28 mi W of Bisbee, underground, Za, Pb. Ag, Aa, Co

STARLIGHT MINE OP Owners: Edward & Blanche Harrison Lessee: Il Wolfe, Box 2324, Globe MINE, Graham Ce, Ag, Pb Idie

STEVENS MINE
BOX 772, Clifton
Mgr: C E Stevens
Gen Supt: Jesus Germes
MINE, 5 min No Clifton, underground, Cu
Prod: 50 tons
Mine Sapt: C E Stevens
Asst Supt: Jesus Gormes
Furzman M Gormes
Mine Engr: R L Naedwin

STODDARD MINE Box 156, Mayor Owner: Eugene Meyer

STRONG & HARRIS, IMC c/o John P Herndon, Vanadium, New Mex SUNNYSIDE MENE, Santa Cruz Co, Ag, Cu, Pb

SUMMIT COPPER MINES, INC
Box III, Payson
Pres & Gen Mgr: H W Thompson
VP: Dr A L Gagnier
Sec. Nins M Thompson
SUMMIT MINE, 6 mi NW of Payson,
underground, Cu, Au
SO-TON GRAV MILL
Jale

SUN-GOLD MNG CO Til Valley Nat'l Bidg, Texaon Treas: John C Gungul SUN-GOLD MINE, Pisma Co, underground, Au Mgr: Alfred & Turner Idle

SUNRISE MNG CÓ Amads Mgr: Ross Barclay MINE in Santa Crus Co, 70, Ag, An

SUNSET MNG CO 213 Minns St. Sen Prescisco, Celif Pres: J L Bajocchi VP: W O Kay Sec: Charles Greenberg MINE, Pinal Co, Au, Ag, Cu Under devel

SUTTOM - DRYSDALH CORP Box 35, Willion Pres & Cen Mgr: Wayne Suttom SUTTOM MINE, 16 mi SW of Bowle, underground, Au, Cu, Pb Under devel SWISSHELM MINE
Box 503, Fornbaces
Lesse: William Ward
MINE, 50 mi NE of Tembetone,
underground, Au, Ag, Pe

TEJON MINE LSG & DEV CO Box 603, Tombatom Lewsee: William Ward TEJON MINE, 18 mi NE of Tombatone, underground, Cu, Au, Ag Under davel

TIAJUANA MINES, ENC
2200 W Van Buree, Fhoents
Pres & Gen Mgr. Ch T Tucker
VP; Harold W Rehfeld
Gen Sight & Gool: Joseph G O'Brien
Purch Ags. Ch T Tucker
TIAJUANA & HERR GPS, Amado,
Santa Crue Co, underground, Pb,
Zn, Ag, Cu

TOLEDO MNG CORP
622 Market St, Yeungstewn, Ohio
Pres: Port B Mollinger
VP: CL Thomas
Sec: C L Robinson
Dir E W Bailey
MT SPRING MINE, Bagdad, wein,
shaft, Zn, Ph, Ag, Cu, Au
idle

TOMBSTONE DEV CO
Tucson
TOMBSTONE GROUP, Ag. Pb
Supt: Brooks Davis

TORNADO MNG CO
BOX 1006, Miarmi
Mgr: Wan Humphrey, Olobe
LONGON ARIZ MINE, Banner
dist, Zm, Ag, Pb
Lille
TORNADO MINE, near Winkelman,
Pb, Zn
Litle

TURKEY CRK PLACER Cleator Opr: Thomas R Cleator MINE, Yavapai Co, Au

UNITED MINERALS CORP 518 Felt Bidg, Salt Lake City, Uta Ges Mgr. G W Snyder, Jr Geol: M C Godbe III SANTA CRUZ MINE, Putagorda, Harshaw mng dist, NE of Nogales, underground, Cu ldis (See Utah, New, Ida)

UNITED MINES CO Chloride Pres: M B Maxwell VP: Dr JO Irish Sec-Treas: C L Lind EVAHOM, LITTLE TENM, & SCOTCH LASSIE GPS, An, Ag, Zn Litz.

U S LIME PRODUCTS CORP, GRAND CANYON LIME & CEMENT CO DIV 173 S Aivarado St, Los Angeles, Calif NELSON PLANT, open quarry Supt: Rey Laner (See Calif, Nev & New Mex)

UNITED STATES SMELTING REFINING & MSG CO Mohave County GOLD MINE Idle (See Alasha, Utah, New Mex & East)

U S TUNGSTEN CORP
Bon 300, Congress
Pres: JP Zannaras
VP: Charles P Lower
Sec: John P Roblinson, Jr
ZANNARAPOLIS MINE, 33 mi NW
of Congress, underground, surface, scheelite
Under devel
Mine Pereman: L M Rutledge
250-TON GRAV-FLOT MILL
MILI Poreman: Jess Parris

UPSHOT MINES, INC
Box 501, Preport
Pres: Omar D Smith
VP: D H Wachtel
Sec-Treas: C E Ekroth
UPSHOT MINE, Yavapai Co,
underground, Ag, Cu, Pb

VANADIUM INVEST CO Box 1005, Globe Mgr: R Scott 91 GROUP, Pinal Ce, Pb, Ag Idle

VOGEL, M CO Tumbistics MINE, Cochise Co, Au, Pb (Leased from Gallagher Vanadium & Rare Minerals Corp)

WESTLAKE, BRICE H
BOX 1831, Globe
WESTLAKE TUNGSTEN MINE, 12 mi
SW of Globe, underground, WO3, Ag.
Cu, Mo, Au
Under devel

WHITE MNG CO
clo Allen L White, Jr., Mayer
PIEDMONT MINE, Yavapai Ce,
Au, Ag, Cu, Pb

WILKERSON, J L & CO Crown King Mgr: Ed W Carls MiNE in Yavapai Co, Au, Ag

WILKINS MINE OP Box M. Patagonia Owner Bond Mng Trust Lesses: Thomas Headley MINES, Santa Crus Co, Ag. Po Line

YUCCA MNG & MLG CO
Box 67, Yucca
Pres & Gen Mgr: 81 J Dalton
VP: Pred Wolf
Sec. Ben-F Williams
ANTLER MINE, 11 mi E of Yucca,
underground, Cu, Zn, Ag, Au
Prod: 130 tons
150-TON PLOT MILL²

CALIFORNIA

A H L MINING CO c/o Marvin R Fleming, 1208 High St, Auburn MARY LEN, LODE, Auburn diet

ABBOTT MINES, INC 703 Market St, Rm 1804, San Francisco Pres: R F O'Brion Gen Mgr: C O Reed ABBOTT MINE, Williams, underground, Mg FURNACE

ADAMS, HARRY 1406 Waterman St, San Bernardine ADAMS TALC MINE, San Bernardine, talc

ADOBE MNG CO Sheets County

ALASKA MINE
605 6th St. San Francisco
MANNE, Phise. Au
Mgr: B J Kohlen
40-TON STAND MILL., Pike
(Leasted Mr P Mill., Pike)

ALBERTOLI, MORRIB
PO Box 856, Big Pine.
HOPE (BLACK CANYON)
GP LODE, White Mis diet,
Au, Ag, Cu, Pb, Za

ALCAN MNG CO 5261 Stockton Blvd, Sacramento COFFEE CR DREDGE, Trinkly Riv dist, placer

ALEXANDER, VERN B.
Ft Jones
RATTLESNAKE LODE,
Klamath Riv diet, Au, Ag

ALEXANDER, W & PUEL, W P 114 Silver St, Henderson, New WILSHIRE (MOHAWK GP) LODE, Clark Mt dist, Ag, Pb. Za

ALHAMBRA GOLD MINE CORF Georgetows Pres & Gen May: O H Griggs VP: 5 W Binker Sec-Treas: H A Plaiser Geol: E L Reeves ALHAMBRA MINE, El Derade Co, Il mi NE of Placerville, undergé, Au Hill Supt: Pred J Poarney 50-TON FLOT MILL SUNSHINE MINE, Plumas Co 6 mi 5 of Quincy 1886

ALLIED MINING CO Box 1028, Auburn PILLIKEN MINE, El Dorado Co, Cr Elle

ALMADEN DUMPS
Almaden
MINE, Santa Clara Co. Ng

ALPINE MINIMO CO c/o Clyde Sherwood, 703 Market St, San Francisco ALPINE MINE, Hope Valley, 30 mi Wof Woodfords, undergd, WO3 Idle

ALTA MINING CO, INC
Box 366, Crescest City
Pres & Gen Mags John Moce
VP: Joe M Peinury
Sec: Raiph E Yoder
Gen Supt John Noce
ALTA MINE, Low Divide, Del Norte
Co, 8 mi E of Smith Riv undergr, Cu

ALTA COPPER CO, INC
Box 309, Gas suet
Pres & Gen Mgr: John I Nooe
VP & Asst Gen Mgr Joe Reimars
Sec: Ralph Yoder
Guol: Roger Beals
ALTA COPPER MINE, 8 ms E of
Smith Riv, Dei Norte Co, undergé, Cu
Under devel

AMERICAN ASBESTOS MNO CORP 11 W 42nd St, New York MINE, Calaveras Co, autostos Idia

AMERICAN CHROME CO I Montgomery St, San Francisco Pres: Estey A Jolian (See Montana)

AMERICAN MINERAL CO 840 S Mission Rd, Los Angeles 23 Press: A H Stalmer WF & Gen Mgr: W A Merie WHITE ROCK MINE, 12 ml NW of Cootil, surf, ceramic clay Prod: 400 tone per me Mine Supt: E E Edgemon 100-TON MULL, Los Angeles, commercial grinding CLAY PRT, Kern Co

AMERICAN POTASE &
CHEM CORP
3030 W 6th St, Los Angeles \$4
Pres: Peter Colefax
VP of sales: W J Murphy
VP, tech oper: W J Murphy
VP, maketch oper: B B Commo
West Sales Mgr: W J F Francia
Pl Mgr: A J Anderson
Pur Agt: L B Cornelius
MINE, Labe Brines, potash,
borax, seda salts, Br, L4
Prod: 850,000 tons yearly

AMERICAN SMELTING & REFINING CO 405 Montgomery St., Sen Francisco BLAST FURNACE, Setby, lead Mgr: W S Reid Gen Supt: H F Wagner Fur Agt: J M Monne Smelter Supt: FC Moras Smelter Supt: FC Moras Media Supt: B K Shedd Mast Mecht: W H Holmes (See Arts, Colo, Ids, Mox, Mow Mex, Olds, Tex, Utah, Wash; Control & East)

AMACONDA COPPER MIIG CO WESTERN OPERATIONS VP: CH Beele Gen Mgr: FA Wandlaw, Je DARWIN MINES, Darwin, Ph. Ze, Ag Mgr: FE Tong Pur Agt: TK Devis Mine Supt: Mock M Tilley Foreman: JC Kinneberg Engr & Geol: D L Davis
Ch Elee: F J Pactach
Mast Mech: R M Treatons
425-TON FLOT MILL, Darwin
Supt: E G Peterapn
Asst Supt: J H Teel
Metal: W B Davis, Jr
Assayer: Louis Warnken, Jr
SHOONE MINES, Tecops,
Underground, surface, Ph, Ag, Au, Zn
Idle
Idle I Gee Ids, Nev, Mont, Utah & East)

ANDERSON ROCK PLANT Box 1372, Fresno MINE, Fresno Co, placer, Au

ANCHO ERIE MNG CO
401 2nd 5t, San Francisco
Gen Mgr: Bert C Austin
BiNN, Wash dist, New Co,
underground, Au
Supt: S J Odgers
200-TON CYANIDE FLOT MILL
Idle
Supt: Ira D Billick

ANKENEY, GEORGE D 642 N St, Yreka LONG GULCH CLAIM, Siskiyou Co, underground, Au Idle

ARCHER MINING CO
510 \$ Spring St. Los Angeles 13
Pres: B C Abos
VP.F B Belecher
Gen Mgr & Pur Agt. R D Prior
ABCHER MINE, Coalings, Hg
Supt: Gene Hermansen
Engr: V Areinriga
Idle

ARGENTA CONS MNG CO 257 S Spring St, Los Angeles 12 Pres: Harry Lee Martin VP & Sec: Edwin C Horrell (See Nevada)

ARGO, ROY 11837 S Loma Dr. Whittier LILLY GP LODE, Slate Range dist, Au, Ag, Pb Cu, Sb

ASELTINE, E P
Box 206, Darwin
LEARY LODE, Cerro Gordon
(Swansea) dist, Zn Pb, Ag, Cu, Ag

ATKINSON, E B
FO Box 101. Johannesburg
NINE SPOT, Randsburg diet,
placer, Au, Ag
YELLOW ASTER LEASE, Au, Ag

ATOLIA MNG CO
1922 Crocker Bidg, San Francisco
Pres: PR Bradley, Jr
UNION MINE & others, Atolia, W, Au
(Sold to Hoefling Bros)

BACKELS, ANDREW & PAUL 80 Pierce St, San Francisco 17 EMPIRE-LONE STAR GP, 12 ini NE of Downleville, undergd, Au MERICAN MINE, 2 mt E of Goodyear's Bar, Au Idle

BADE, WILLIAM J 4114 Sherman Way, Sacramento LEE MINE, Rocklin (Loomis) dist, placer, Au, Ag

BADLEY, VICTOR E 2829 Morcom Ave, Oakland ALBIA MINE, New Riv dist, placer, Au, Ag idle

BAKER, FRANK Route I, Barstow HARD LUCK GP LODE, Solo dist, San.Bernardino Co, Po, Ag, Cu, Au

BANICA, ROBERT L 3US Klockhoff St. San Pedro SLATE CREEK PLACER, Strawberry dist, Yuba Co. Au. Ag

BARIUM PROD, LTB
SAVERCOOL MINE, Plumas Co,
barite
ALMANOR MINE, Greenville, barite
Mgr: JB Perry
Supt: H J Tillia
Engr: R F Love
Mill Foreman: T_J Cayot
(See Barium Products, Nevada,
intermountain Chem, Wyo,
Food Mach & Chem, East)

BARNES, A E & ROBERT II MILLARD 4355 Arizona, San Diego Box 88, Quincy DAVIS MINE, Greenville dist,

BARTON, W B CHROME ORE CO P U Box 77, Grante Paes, Oregon MINE, Del Norte Co, Cr

placer, Au. Ag

BASIN MINING CO
Box 726 Bakersfield
Mgr: Dan Cronin
MIDDEN TREASURE LENA & JOE
WALKEN MINES, Green Mt diet,
lode Ag. Au
Idle

BASSLEY, PREDERICK Box 443, Yreka CHERRY HILL MINE, Scott Riv

BAUD B MNG & MLG CO
Box 1162, Trona
Gen Mgr: J H Bennett
Asst Gen Mgr George A Smith
SKIDCO MINE, 60 ml N of Trona,
under ground, Au Ag. WO3
Under devel
40-TON PLOT-GRAV-CYAN-AMAL
MILL, Emigrant canyon
Mine & Mill Supt: J H Bennett
Asst Mine & Mill Supt: Geo A Smith

BAUMEISTER & SON
Box 396, Cloverdale
CULVER-BAER MINE, Cloverdale,
Hg

BEAR CR MING CO
(KENNECOTT COPPER CORP)
1608 Hobart Bidg, San Francisco
Diet Geol: Donald D Smythe
(See Colo, Minn, Wash, South &
East)

BECK, MARTIN Box 343, Mohave GUNTREE MINE, Kern Co, WO₂, Sb

BEDELL, STUART BIE Plan WAUCALIA MINE, Inyo Co, W

BELDEN AMADOR MINES, INC Box 30, Pine Greve Pres: Donald Grifin VP & Gen Mgr: Loon M Banke Sec: Don A Weber BELDEN MINE, Pine Grove, 20 mi E of Jackson, Au, Ag Prod: 40 tons 40-TON GRAV FLOT MILL

BEAR CREEK MNG CO, SOUTH WEST DIST (KENNECOTT COPPER CORP) 1608 Hobart Bldg, San Francisco 6 Dist Geol, Donald D Smythe (See Minn, Wash, South & East)

BENNETT & BARGINSKI
1534 N Curson Avs., Los Angeles 46
Gen Mgr. J H Bennett
Asst Cen Mgr. Max Barginski
INDEPENDENT MINES, Box 4, Troma,
2 mi from Aguerroberry Pt. Death
Valley, undergd. Au, W. Ag
Prod: 10-25 tons
40-TON GRAV-CYAN-AMAL MILL,
Harrisburg Flat
Mine & Mill Supt. J H Bennett

BENNETT MNG CO Big Bar MINE, Trinity Co, placer, Au, Ag

BENNETT, PERRY T Box 324, Weaverville REX MINE, Trinity Riv dist, hydraulic placer, Au

BENOIST, M L
Box 203, Weaverville
CHLORIDE & GLOBE MINES, 23
mi from Weaverville, undergr,
surface
Prod, 10 tons *
30-TON Mil.L.

BENWARE, G E
Bishop
TREASURY \$2 MINE, San Bernardino
Co
BISHOP CONCENTRATE & CLNG CO,
clean scheelite. Invo Co

BERG, ROY M
Box 478, Desert Center
CAP MUNTER LODE, Chuckawalia
dist, Fb, Ag

BERG & SCIOCCHETTI Box 637, Hollister JUNIPER MINE, Paicines, 51 mt SE of Hollister underground, Hg Pred: 14 tons Mine Supt. Louis Sciocchetti

BEST MINES CO
BOX 177, Downleville
Cowner: C L Beat
Pres: I L Beat
VF: B C Austis
GOIN 197: L L Heelsdonk
GOLD BLUFF, BRUSH CR & GXFORD
BINNES, underground, Au
Mine Supt. W T Reed, Jr
Engr: B C Austin
FLOT MILL
Supt; John Folsoft
Foremas: Vernon Huffman

BIG GOLD MINE Box 251, Randsburg Opr. J M Kreta Au, W

BILLS, L C 3814 Chestnut Ave, Long Beach JIM TOM CLAIST, Randsburg dist, Au ADA R MINE, W

BISHOP CONC & CLEANING
CO
Bishop
CUSTOM MILL, W & base meta! ores

BLACKSTONE MINE

6208 Barrett Ave Richmond

Gen Mge. LA Sanches

BLACKSTONE MINE, 4 mi N of

West Point, underground, Au, Ag, Po

Prod: 30 tone

Supt: Elliot H Syme

Foreman: Louis Sanchez

30-TON FLOT MILL

Foreman Tony Partal

SMELTER, Au, Ag

BLEW JORDAM ZINC MIME 2821 Sichel M. Los Angeles 31 Opr: R B Lyttle MINE, 15 mm NW of Fontana, undergd, Zn. Pb. Ag. Cd Under devel

BLICKENSTAFF, E B Mojave STANDARD LODE MINE, Mojave dist, Au. Ag

BLUE RIDGE MIDWAY
GOLD MINES CO, LTD
Callahan
Pres. Gerald B Hartlay
Sec-Treas: S H Hartlay
TIPTOP & HILTON CR MINES,
Mono CO, WOS
SUGAR HILL MINE, Callahan, Au
Idle
BIG BLUE MINE, Callahan, Cu
Ldie
PILOT MINE, Downleville, Au

BLYTHE MANGANESE CO 8845 W Olympic Blvd, Beverly Hills ARLINGTON GROUP MINE, Riverside Co, Mn (Leased to Dan Figueroa)

BON TON MINING CO Murphys BOWER LODE MINE, East Belt dist, Au. Ag

BRADFORD, L. M.
Box 307, Maders
DAULTON MINE, Daulton dist.
Ag. Cu, Pb.
ldle

BRADLEY MINING CO
420 Crocker Bidg, San Francisco
Pres: Worthen Bradley
Sec-Treas: E A Griffen
REED MINE, Monticello, Hg
SULPHUR BANK MINE, Clearicke
Oaks, Hg
OREAT WESTERN MINE,
Middletown, Hg
(See Idaho)

BRADLEY & EKSTROM, INC 320 Market St, San Francisco
Pres: E O Elatrom
VP & Gen Mgr. R F Helmike
See: M E Bradley
MINES, Calif. Oregon, Nev &
Utah, underground & surface,
Cr. Fe, Mn, W
Mine Suyt: J A McDonald
Mine Foreman: J L Bay
Mine Engr: J K Benedict

BRIGOS, HARRY E
BOX 613, Trons
RED CLOUD MINE, 10 mi E of
Ballarst. Panimint Mts, underground,
Au, Ag. Pb
Under devel
SOUTHERN HOMESTAKE MINE,
8 mi S of Ballarst, underground,
Au, Ag
Under devel

BRIGHT, T L.
Independence
TELEGRAPH MINE, Inyo Co.
Au. Ag

BROCK, ROBERT River Pt, Box 23, Madera HEISKELL PROP, Madera Co, Au Idle

BROWN, EUGENE R O'Brien, Oregon HIGH PLATEAU MINE, Del Norte Co, Cr

BROWN, JOSEPH GABEL Camptonville JOUBERT (DEPOT HILL) MINE, placer PIKE, Indian Hill dist, Av., Ag

BROWN BEAR MINES
Box 86, French Guich
Gen Mgr & Consul Engr E E Erich
BROWN BEAR, TANGLE BLUE &
REID MINES, 12 ms w of French
Guich, Shast Co, undergd, Au
Lidle
70-TON GRAV-FLOT MILL at
Brown Bear
30-TON GRAV-FLOT MILL at
Tangle Blue

BROWN'S CREEK PLACER Box 23, Weaverville GOLD PLACER, Trinity Co

BROWNSTONE MNG CO, INC Box 398, Bishop Pres & Gen Supt: W V Skinner BROWNSTONE MINE, Bishop, 20 mi W of Bishop, undergd, scheelite LE MOYNE MINE, 19 mi NW of Towns Pass, Death Valley, underground, Ph. Ag, Au Prod: 20 tox

BRUBAKER, KEATS
'Cectiville
HORSESHOE BEND MINE, Salmon
Riv dist, placer, Au, Ag

BRYAN, BERT L. Smith Plat IDA BRYAN PROP, El Derado Co, Au

BUCHENAU, 18 J Star Rt. Box 17, Madera JESSIE BELL MINE, 15 mi NE of Madera, underground, Cu, Au, Ag Under devel Prod: 38 tons Mine Supt: Bud Syms 30-TON FLOT MILL. Garfield, Utah Mill Supt: Pete Roseti

BUCKMAN LABORATORIES,
INC
Geyser Road, Cloverdale
Pres: Dr S J Buckman
VP: W D Stitt
See: C H Turnor
BUCKMAN MINE, 18 mi E of
Cloverdale, undergd, surface, Hg
Under devel
Prod: 40 tons
CLOVERDALE MINE, sear Cloverdale,
Hg
Mine Supt V L Hill
Coen pit Foreman: R Waggoner
Undergr Foreman: T Sullivan
100-TON ROTARY FURNACE
Foreman: H D Field

BUENA VISTA NO 2 MINE Box 25, Redding Owner: H G Graves MINE, 3 mi W of Redding, Au, Cu 20-TON FLOT MILL

MINING WORLD

BUNKER HILL MNG CO
Box 1347, Redding
Mgr & Eng: A Mansfield
BUNKER HILL MINE, 3 mi NW of
Redding, underground & surface,
Au, Ag. Cu
Foreman: Peter Kanuck
Idle

BURGNEN, DON Bez 485 SHAMROCK MINE, Inyo Co, W

BURTON MINES, INC
Bosammend
Mgr: C G Burton
Asst Mgr: G A Settle
Purch Agt: George McNamee
TROPICO MINE, 5 ml W of
ROSammond, underground, Au, Ag
RUTH MINE, 13 ml NW of Trons,
Idle
100-TON CYANIDE MILL
Poreman: Alec Burton

BUSCOY, ANTON
Twain
DUTCHMAN #1 MINE, Butte
Valley dist, placer, Aug. Ag

BUTTE CREEK ROCK CO
Box 512, Chico
BUTTE CREEK GRAVEL PLANT,
Butte Creek dist, Au, Ag

BUTTE LODE MNG CO Box 195, Randsburg BUTTE LODE MINE, Kern Co, underground, Au Ag CUSTOM MILL

BUTZ, ALBERT Box 1103, Nevada City SUNSHINE LODE, Grass Valley

C & H MATERIALS CO PO Box 638, Oildale C & H GRAVEL PLANT, Bakersfield dist, sand and gravel, Au, Ag

C A M LEASING CO Iowa Hill OCCIDENTAL MINE, Placer Co, Au

C M S STRATEGIC METALS, INC 8000 SE Foster Rd. Portland 6 CLAIMS, Del Norte Co. Mn idle

CALAVERAS CENTRAL
GOLD MNG CO, LTD
Angels Camp
Pres & Gen Mgr: Harry Sears
Mgr: Desmond Sears
MINE, underground, Au
CRUSHING A SCRUBBING PL, Au, Ag
Prod. 600-800 tons
Under devel

CALIF INDUSTRIAL MINERALS CO Box 188, Friant Owner: Forrest S Taylor TAYLOR MINE, ne Friant, volcanic ash 150-DISPERS DRY-MILL

CALIFORNIA LIMESTONE PRODUCTS, INC
278 N Canon PR, Beverly Hills
Pres & Magr: R F Hall
VP & Geol: Robert R Platt
See: Mairice Willows, Jr
MINES, 128 N Main St, Blythe, 18 mi
NW of Blythe, surface, Min, S,
gypsum, limestone

CALIFORNIA MINERALS c/o Roy Cummings, Sir Big Pine, Calif

CALIFORNIA PLACER MIME Owners: Marie & Morton S Biartin, 130 Arlington Ave, Berkeley ? Gen Mgr: H T Martin Metal: Placer Metals Eng Co Geol: Chae S Baley CALIFORNIA PLACER, 24 mi E of Forest Hill on Forest Hill divide, hydraulic, Au Mine Supt: G A Martin

CALIFORNIA POTTERY CO Box 65, Niles Clay CALIFORNIA QUICKSILVER MINES, INC Williams Pres. R F O'Bryan Gem Mgr. C O Reed Geol: F D Hansch ABBOTT MINE, 25 ml W of Williams, underground, Hg Prod: 40 tons

CALIFORNIA SILVER CORP 9814 Washington Blvd, Culver City ANNEX MINE, Silurian dist, Ag. Cu.

CALIFORNIA TUNGSTEN
921 Felt Bldg. Salt Lake City, Utah
TRIANGLE MINE, Kern Co, W

CALIVADA DEVEL CO, INC
Box 4, Garden Valley
Pres & Gen Mgr: Hal T Hall
VP: Leuis R Ball
Sec & Asst Gen Mgr: E E Hall, Jr
Elee Engr: Edmund Cheek
Gen Supt: R A Hathaway
Mech Engr: Frank Boucher
EL DORADO COPPER MINE, Id mi
N of Placerville, underground, Cu
Under devel
Prod: 135 tons
100-TON PLOT MILL

CALRADO DEVEL CO
218 N Canon Dr. Beverley Hille
Co-partners: R. 5 Hall & Maurice
Willows, Jr
Gen Mgr: R. 5 Hall
Gen Supt & Geol: Robert R Platt
BLACK JACK-ARLINGTON
MANGANESE MINE, 22 mi NW of
Blythe, surface, Mn
20-TON HY MEDIA MILL, 1928,
at Inca siding
(Leased to Blythe Manganese Co)

CAMPION, IVAN H Somerset via Coles Station IRISH SLIDE MINE, 23 mi SE of Placerville, underground, placer, Au. Ag

CARPENTER, A C
Box 576, Yreka
THE WINNER LODE, Yreka dist,
Au. Ag

CARTER, STERLING
Mercer Caverno, Murphys
TUNGSTEN HILL MINE, 10 mi W of
Bishop, underground, scheelite
Prod: 15 to 20 tons
Mine Supt: Gene Stockman
Foreman: Robert Barron
(Lessed from G Crawford, Bishop

CASA DIABLO MINE Bishop Mgr: JW Bertram MINE, Mono Co. Au, Ag, Pb

CASCI RANCH PLACER 204 N Pine St, Nevada City MINE, 12 mi E of Nevada City Under devel

CASTLE, E C
Box 139, Bishop
WHITE CAPS MINE, Inyo Co, W

CASTRO CHROME ASSOC 232 Montgomery St, San Francisco Opr: G I Barnett MINE, near San Luis Obispo Creek GRAV MILL

CENTRAL EUREKA MNG CO
Russ Bidg, San Francisco
Pres & Gen Mgr: JD Swift
VP: Keith Kunze
Purch Agi: E Cunningham
Sec-Treas: D D Smith
Gen Supi: A Kendall
MINE at Sutier Cr. Amador Co,
underground, Au, Ag
Foreman: E Mortensen
Smithose: Sam Hargie
Mich Engr: Primo Prediant
Elec Engr: Puul Ransom
Safety Engr: Nick Eliskovitch
250-TON STAMP PLOT MILL with
cyanide unit, Au, Ag
Supi: Keith Kunze
Foreman: Don Jones

CENTRAL ROCK & SAND CO PO Box 425, Sanger Gan Mgr: John D Hare SAND & GRAVEL PTT, 2 1/2 mt E of Sanger, sand, rock, Au Frod: 400 tons CHAMBERLIN, CHARLES.'
Box 24, Johannesburg
OK GROUP, Kern Co, undergd, Au

CHAPMAN & SONS Junction City CHAPMAN & FISHER PLACERS, Trinity Co, hydraulic, Au Supt: G P Chapman

CHEMICAL & PIGMENT CO, THE 766 50th Ave, Oskland (See Glidden Co)

CHIAPELLA, S E 1825 No Les Palmas, Los Angeles MAMMOTH TALC MINE, San Bernardina Co

CHLORIDE CLIPPS MINE Beatty, Nev MINE, Inyo Co, undergd, Au, Pb

CHOWCHILLA DREDGE CO Box 348, Whittier CHOWCHILLA MINE, Madera Co, placer, dredge, Au

CITY BLUE GRAVEL MINE
Box 206, Redding
Officers: HG Hampton, R H
Cochran, Donald Flaylinsen
MINE, I mi W of Redding, undergd, Au
23-TON FLOT MILL
His

CLAIR, V D Box S, Trona MARGARET MINE, South Park dist, Inyo Co, undergd Au Ag

CLAREMONT MNG CO
336 W 2nd St, Claremont
Pres: Charles L Workman
VP: Earl M Stepp
Sec & Gen Supt: Harry B
Hollingsworth
SAGAMORE MINE, 17 mi S of Ivanpah
undergd hubnerite, Pb, Ag, Cu, Zn
1816

CLARE, CHARLES A
PO Box 41, El Dorado
OPHIR LODE, Mother Lode dist,
Au, Ag
Lillie

CLARK BROS
Star Rt, Box 32B, Folsom
PINE KNOLL MINE, West Belt
dist, Au, Ag

CLAYE, ROBERT JR
Hilt
GOLDEN RULE MINE, Siekiyou Co,
underground, Au
MILL
Late

COLE & SWIFT
Box 15%, Randsburg
COLE GROUP, Placers
(Sold to West American Tungsten Co)

COLEMAN, CARLTON c/o Nimshew State, Chico COLEMAN PLACER RANCH, Butte Creek dist, Au, Ag

COLLINS, JOHN T Julian ELLA GROUP MINE, San Diego Co, underground, Au, Ag Isla

CONCONULLY MNG & MLG CO
Best Blaff
Cr

CONDA PROPERTIES
951 La Cienega Bivd, Los Angeles
GOLCONDA MINE, San Bernardino
Co, asbestos
Under devel

CONLEY, L 3
1101 Winchester, Medford, Oregon
BLACK BEAR MINE, Steknyou Co,
chrome

CONRAD, J H
Columbia
SHORE LODE, Mother Lode dist,
Au, Ag

CONROY, EVERETT R Horse Creek BARTON PLACER MINE, Klamath Riv diet, Au, Ag CONS MANGANESE CORP 300 Montgomery St, San Francisco MINE, Sonoma Co, Mn

CONS ROCK PRODUCTS CO 2730 S Alamede St, Los Angeles St Pres Robert Mitchell VP. Q W Best Sec: S F Whaley Prod Mgr: R C Griffin Purch Agt: L L Haney Safety Engr: R E Montgomery LARGO PLANT, Asses, surface, Au Supt: G A Lagrone

CONSOLIDATED TUNGSTEN 1739 Terrace Ave, Freeno Owner: AR McGuire MINE 23 mi E of Dinuba, W Foreman: C L Tibbale 80-TON GRAV PLANT Supt: Ellie Sterling

CONTINI BROS Star Route #2, Jackson CONTIN & 1% L LODE MINES, 7 1/4 mi E of Jackson on Hiwy 88, underground, Au

COOK, JOSEPH W
Tecopa
PADDY'S PRIDE LODE, Confidence
dist, Pb, Ag, Au

COPE, DANIEL M
Berry Creek
LITTLE KLONDYKE PLACER MINE,

COPPER HILL MINE 209 Post St, San Francisco Trustee: R E Fitsgerald COPPER HILL LODE, West Belt dist, Cu, Au, Ag, Zn Under devel

COPPER QUEEN MNG CO
c/o Miles W Edgoill, President
1331 "T" St, Sacramento
COPPER QUEEN GROUP LODE,
Sawpit Flat dist, Cu, Aw, Ag
Idle "

CORONADO COPPER & ZINC CO 523 W 6th St, Los Angeles 14 Pres. R W Moore VP: B T Mudd Gen Supt: K C Richmond Sec & Purch Agt: A I Davidson (See Arizon)

CORDERO MINING CO
131 University Ave, Palo Alto
VP: SH Williston
Gen Mgr. J Eldon Gilbert
MAY LUNDY MINE, Mono, 10 mi W
of Mono Lake, Au
1818
WUIEN SABE MINE, Hollister, 18 mi
E of Hollister, underground, Sh
1818
Gen Supt: Herbert Mitchell
(See Nevada and Oregon)

COSTA, JOSEPH E Bear Valley Co-owner. Eh J Maria, Mt Bullion SPECIMEN LODE, Mother Lode dist, Aw, Ag Under devel

COSUMNES GOLD DREDGING CO 465 California St, San Francisco 4 Pres: G M Standifer Gen Mgr. A W Hopfield PLACER, Slough House, bucket dredge

COSUMNES MINES, INC Grissly Plats MINE, El Dorado Co, Au, Ag Idle

COWAN, JAMES H Little Lake MAYBE MINÉ, Inyo Co, W

COYOTE MINING CO

CRABTREE & SULLIVAN Jackson MINE, Amador Co, Mn Idle

CRAIG, BERT Box 6, Essex CRAIG MINE, San Bernardino Co, W CRAIG, MAS C W
2657 Pertole Way, Sucramento
PERKINS GRAVEL CO FLANT
American River dist, placer, Au, Ag
10ie
HADGER GRAVEL FYFS &
DEL PASO GRAVEL FYFS,
Folsom dist

CRAIG, SAM Box 72, Eases JUMBO & PACKARD CLAIMS, Sun Bernerdon Co, W

CRAWFORD, G
Bishop
BROOKS MINE, laye Co, W

CRAWFORD, LOWELL V & COOK, JOSEPH W Tecopa PADDY'S PRIDE LODE, Confidence dist, Pb, Ag, Ae

CROTSENBERG, & D Mercrille BRUSH CREEK MINE, Kera Co, W

CRUMPTON, VICTOR Happy Camp MINE, Siskiyou Co, Au, Ag

CRYSTAL CAVE MNG CO Box 782, Las Vegas, Nev CARBONATE KING ZINC LODE, Ivanium dios, Em. As., Ag. Po Idle

CUMMINGS, M L. 3041 Montgomery Way, Sacramento FRIENDLY GROUP, 2n epit dist, placer, du, Ag

CUMMINGS, THOMAS M Descrip MANZANITA PLACER MINE, New Riv dist, Am, Ag

CYCLONE OAP MANE
Box 475, Grants Pass, Ore 1)
MINE, Statiyou Co, 30 ml 8 of
O'Brien, Ore, suderground, Cr
Prod. 800 tone monthly
Mine Sapt: W 8 Robertson
Asst Supi: C O Anderson
Forenan: A E Eletrend
(Lensed to W 8 Robertson,
Box Exercises, Associa

CZERWONKA, PRANK PO Bee 104, Lecorne Valley RAMBLER, Blackhowk dist, bode

DAKIN CO
SELI Hittoide Dr. Burlingame
Pres: Fred H Dukin
VF. Wesley W Kergan
Sec: Menrietta Dukin
UNCLE SAM GOLD) MINE, 10 mi
NW of Contral City, Shasta Co,
undergrowed, Au. Cu, Zn, Ag
Idle

DARRINGTOW, LESLIE Star Rt 60, Folsom JOHN AVERY PROP, Placer Co, Au Life

DARWIN ANTIMONT NO 3 514 1/2 N Main St, Santa Ama 56 Opr: James B CR Life

DAVIDSON, BERT No Bloomfield Star Rt, Wevada City SADE D MINE, Newada Co, underground, Au MILL. 1884

DAVIES, TOM
Callerte
JUAN DOSE MINE, Kern Co, underground, Au, Ag
MINNIE ELLEN MENE, Tulare Co
P 6 D LODE, Agua Collecte dist,
Ag, Au
Lills

DAVIS, CLINTON P
Box 32, Greenwood
C B DAVIS PROP (McGRUBB) LCBE,
Mother Lode dust, Au, Ag

DAVIS, RICHARD D 1144 lith St, San Bernardson COPPER CRYSTAL LODE, Slave Range dist, Pb, Ag, Co, Zn DAVIS, ROBERT B Rt 2, Box 5000, Beat to BEHOSTOON SAND & ORAVEL PLANT, Folsom dist, As, Ag

DAVIS, W.G. 1949 193rd Ave. Oxidized REDCAP GROUP, Orleans dist placer, Au, Ag

DEER TRAIL MNG CO
Gen Bel, Vreka
Gen Mgr: LG Crow
DEER TRAIL MINE, 32 mi W of
Yreka, underground, Au, Ag, Ph
Mine 4. Cone Engr: Carl W Yatee
25-TON GRAV-PLOT MILL.

DEL MONTE PROPERTIES
CO, SAND DIV
Box 150, Pacific Grovo
Pres: S F 58 Morse
Plant Mgr: W E Messner
Sales Mgr. P C Vaisntine
Metal: Henry Benach
Gen Supt. C 3 Houseann
MINE, Del Monte Paress, Pabble
Beach, ourface, glass sand,
feldspar, gr indus minerals
Frod E99 tons
FLOT MILL

DEL NORTE MINIMO CO Mojava DEL NORTE MINE, Wildrese dist, Juda Au

DELL OSSO GOLD MNG CO-Box 3435, Terminal Assess, Los Angeles 54 DELL OSSO LODE, Talvord mng dist, Au, Ag, lime, garnete & silica

DESERT TALC & CLAY CO
629 N LaBres Ave. Los Angeles
Pres: R J Schroeder
VP: Drew Schroeder
Sec: Hazel Hawkins
YUCCA GROVE MINE, 23 mi E of
Baker, underground, twic
Prod: 10-12, 999 toss annually

DIAZ, REYES & CARRILLO, JUAN Box 21, 16ria . AURORA MINE, San Bernardiae Co, Hg

DICALITE DIV, GREAT
LAKES CARBON CORP
913 S Flower St. Los Angeles 17
Pros: George Stake!
Opr. Mgr. E A Marcia
Gen Mgr. D L. Mariett
Gen Mgr. D L. Mariett
Ger Agt: T D Moir, Bes C, Lempoc
PLANT 3, T on W of Lempec, burface
distomar-sus rarth
MILL, Lompoc
Mill Supt E D Ingram
Asst Supt: R W Yacum
Foreman. Martia Grycub
(See Gr Lakes Carbon Cerp, Colo,
Nev. New Mem. Ore, Cast)

DICKEY EXPLOR CO Alleghany ORIENTAL LODE MINE, Alleghany dist, Au, Ag

DIFFENBAUGH, CLYDE Meur Valley NELLIE KAHO LODE, Mother Lode dist, Au, Ag

DILTZ ORO GRANDE MRG CO 414 21st St, Merced Opr: J J Fulham MINE, Mariposa Co, Au

DITCHLINE MINIMO CO
Lewiston
TRINITY RIVER LODE, 1/8 mi NW
of Lewiston, underground,
inchesite, Au
Under devel
Prod: 1-2 tone per week
Mine Supt: Torn Cony
Mine Engr: Alox Nativesko
8-TOH Office Mail Supt.
Mill Supt. Shorty Speare

DOBBINS, D A & ASSOC 1106 W isabel St. Burbank BRONZE MINE, San Bernardine Co. W BONERTY & MORRICE
Forest Hill
MARIGOLD QUARTZ MINE,
Placer Co. underground. As

DONAHUE, LYLE
Casts via Big Fine
TARGET GROUP LODE & MILL,
Deep Springs dist, W

DOSCHEE, CHARLES, VISCOVICH, V & MILOESVICH, STEVE Pine Grave JUMBO LODE, East Belt disk, Au, Ag

DONNER, II L Milton via Parmington BONNER & LOST LOG MINES, Calaveras Co, Au

DOUBLE O TOMBER & MNG CO COMBER & MNG CO CO CONTROL OF COMBER & CO

DRUMMOND MINING CO
444 40th Ave, Son Prancisco 21
Pres: Frank Linvini
Gen Mgr W A E Mayer
DRUMMOND MINE, Box 222,
Forestill, Au, Ag
Pereman, Mishael Tanta
50-TON FLOT WILL
Under devel

DREW, FRANK
Johannesburg
ALPHONSO MINE, Kern Co, W

DUBOTS MINES
West Point
Opr. E H Dubots
LOUISE MARGARET CLAIM,
E Belt dist, underground, Au
Lilia

DYSERT, N 8 Sawyers Bar EMMA & RAY PLACERS, 9 ms from Sawyers Bar, As

EAGLE MINING CO Rt 1, Breshop Gen Mgr: Pronk Nelson EAGLE SHIKE # 6 2, 76 mt E of Bishop Ag. Au, Pb MILL Idle

EARLY MORNING MMG CO 1185 Monterey St San Luis Olingon EARLY MORNING MINE, Freeno Co. Co.

EASE, HARRY Happy Camp MARY E LODE, Wamath Riv

EAST RIDGE CO
6N Shorte Place, Lee Angeles 5
Proc: C E Bye 90
VP: F Moldenhauer
Bee; L M Swein
(See Colorado)

EATON, MRS E BURDELL Incine GOLD STAR LODE, East Belt dist, Au, Ag Illie

EDGECUMBE EXPLOS CO 218 S Hudona, Passedona S Pros: Mrs Charlotte Mengan VP: C & Haley Sec. Acrosid Halden Tross & Gon Mgr; G M Morgan (See Alexan)

EDMONDS, W B Raymond EDMONDS DREDGE, Chowchilla Riv dist, placer, As, Ag

EDWARDS, R A Inyohern SNOW WHITE MINE, Kern Co. W EDWARDS, WILLIAM 9
Johnsville
POUR HILLS MINE, Morra Co,
underground, As

EL DIABLO MINING CO Son SAT, Same Pres: WA Trout Gen Mgr: H O-Mohanion MINE near Bishap, W Supt C H Olds 50-70N CONC MART, magnetic separation

EL DORADO LIMESTONE CO Iningle Pres: 3 H Bell Cen May: C R Hicharle Sec: W P Armes Mech Dig: Poul Ranson Mich Eng: Poul Ranson Mich Eng: Poul Ranson Minestone Frod: 490 kms Mine Supe: Wolking, Screening Mills, Crushing, Washing, Screening

ELLIOT, P W 8451 Slater Ave, Rt L Huntington Brooth CHAYCROFT PLACER, Sourceville dist, Au

EMPIRE STAR MEMES CO.LTD
Grass Vettey
Pres JR.C Mass
VP: Carrol Swarts
Cen Mgr H. Pitzgetrick
Ass Gen Mgr F.L Wilson
Metal: James T. Curry
Elec Engr: A Brass
See. John E.D Grunow
Mech Dugr Plut Kenne
See. John E.D Grunow
Mech Dugr Plut Kenne
Seety Engr. C W Plumbre
Purch Agt: W E. Curmen
EMPIRE STAR MINE, Gross Valley,
under ground. Au., Ag
Mine Foremen: E Brobneshire,
T. Thompson, W Wakes
Ch. Engr. M. Wilson
C. Edwards
Assayer, Walkers Poll
RETORT FURMACE
RETORT FURMACE
EDG. Mass Seet.

ESPY MNG CO
B L Easterno, Neverda City
PLACER, 10 me it of maddle
Yuba R, Au, Ag

PAIR OAKS GRAVEL CO 4000 Illinois Ave, Fair Oaks GRAVEL PLANE, Secremento Co, At

PAIRBANKS, & D
Box B, Doggett
DONNA LOY MINE, topo Co tale

PAIRVIEW CHROME WINE 640 Lane St. Wreke Owner. II E Elizabeth PAIRVIEW MINE, Standburg July

PAIRVIEW PLACERS
Leviston
(Joint venture of Sunshine Mng Co.,
The Levisuon Curp & The Saline
Canadian Dreading Col
Owners Rap & Gen Wagr. # & Marphy
Purch Agt. & & Salinde
PLACER, 80 on M of Levision,
8,000 yd bucket dendigs, Au, Ag
Supt. 18 C Yang

FARISS, M M Box L, Hayfork HOME EXTENSION MINE, Mayfork dist, phoser, Au, Ag

FENTON, ORIN Groveland EUNERA LOOK, Cast Best dist, Au, Ag Idle

PERNANDEZ, FRANK C IERR Pine St, Sunta Momina Gen Mgr; George Greve MONO PIUTE RAINBOW MINE, M mi NE of Bluhop, underground, surface, Au, Ag, Pt 35-TON GRAY MILL, Piute Canyon FERRETTI, LEWIS
SEI IN Tunedo Los, Stockhon
MARGUERITE LODB, Mother Lode
dist, Au, Ag

FERRO CO
135 San Vinconni Bine,
Santa Bineira
IRON AGE MINE, San Bermardino
Co, Fe
talla

FIDELITY WIPP Columbia Mgr: Ayas MINE, Au, Ag Supt: Vernon Ray 1-TON CRAV MILA

FIFE, E J & B & Star Ht, Box 729, Locerne Valley BUCKHORN LOOM, Sw of Lacarne Valley, surface, Au, Ag idle
HIGH POINT LODE, HE of Lucerne Valley, underground, Au, Ag
Hits

FIGUERGA MENTE
Box 459, Blythe
Pres: Dan Figueroa
Gen Mgr: Danny Figueroa
Asst Mgr: Ciliert Figueroa
Sec: Miguer A Figueroa
Gen Sugt: Aired Figueroa
Gen Sugt: Aired Figueroa
Gen Sugt: Aired Figueroa
CALAES, 32 ml RW of Blythe, underground, surface, Mm
Prod: 20 lone

PILLIER, EARL J
CHATTE GRID, Madera Ca
GOLDEN RIBBON, TEXAS FLAT,
a KLICKITY KLICK GROUP LODES,
1 mi N of Coarse Gold, underground,
Au
Idle

PINLEY, ROSS & VIGNICE, TOM Panament Springs, Leme Pine Oper: McParland & Hillinger, 23 Pinehuret Ave, Tooelv, Utah MINNEITTA LODE, Modoc dist, Pb, Au, Ag, Zn, Cw

FLEDDERMAN, & G 403 Butte St. Yreke FLEDDERMAN MINE, Yreka det , placer, Au, Ag

PLINTKOTE CO
56th & Alumedo, Lee Angeles
VOORHEIS MINE, Copperopolis,
äsbestos
idis

FOOD MACHINERY CHEMICAL CORP, WESTVACO CHEM DIV Newark Res Mgr: R F Moran WESTVACO MINE, Hollister, surface, dolomite Mine Nopt: R Set-Malmers

FORD, ALEX Box 311, Yrens FRAGA MINE, Yrens dist, placer, Au, Ag

FORD, M M Box 293, Inyokers BIG SUGAR MINE, Kern Co, W

POREMAN & POREMAN
Box 175, Darwin
Pres: L D Foreman
Gen Mgr: R L Foreman
DEFENSE MINE, N md S of
Panamint Springs, underground, Ph. Ag
Prod: 10 tons

POREST QUEER GP
Box 181, Summit City
Owner & Opr: WA Orenat
MINE, 7 me Wed Gabean, off Minage
99, underground, chromite
Under drawt

POSS, A L.
Panamint Springs, Lose Pine
SUR PRISE MIME, Il mi S of Panamint
Springs, underground, Pb. Ag. As
Illie

POSTER, WI, KINKEAD, CLYDE & CARTER, LAWRENCE PO Box 1544, Trona DOODLE BUG GROUP LODE, South Park dist, Pb, Ag, Am 4-D's MINING CO Rt., Box 263-B, Grass Valley MINE, 40 mi E of Neveds City, underground, As. Fe Mine Supt: C P Dancer Under devel

POWLER MINING CORP Dyer, Nevada ALEKANDER (GREEN MOUSTER) LODE, White Mt dist, Ag. Zn. Po., Co. Au.

PRASEUR, HERB Mayfork SUNSET PLACER, Mayfork, Au, Ag

PRITZ, W A
P G Bess 407, Troma
STOCKWELL LODE, Slate Bange
dist, Am. Ag.
Idls
HELEN MINE, Middleton, Hg

PRYE, HARVEY V c/o Inekie Issa, Stirling City MONEY MUSK MINE, Butte Co, Au Illia

FUNK, HAROLD
Rt L, Ben 742, Crescent City
OLD DOE MINE, 13 ml NE of Smith
Riv, underground, Cr
Prod: 1 ton
Mine Foreman: W H Hanley
Engr: Geo Pollard

G & G COMPANY
J M, Alma F & Clark Gould,
Meadow Valley
HAZEL PLACER, Edmanton dist, Au, Ag

GAGE, PRANCIS 1557 S Fairfax Ave, Los Angeles HI GRADE SEESE, Tode, Cedar dist, Au IIIs

GALENA LEDGE GOLD MINE c/o Frisbes & Hoogs 2131 University Ave. Berkeley MOHAWK \$1 & 2 LODE, East Bult dist, Au, Ag IME

GALLAGHER, FRANK E PO Box 172, Merced MARIFOSA LODE, Mother Lode dist, Au, Ag Idle

GAMBELLA, SF Junction Cate GOLD DOLLAR MEME, 6 and N of Junction City, hydrocalic placer, At Idla

GAMBLE, GEORGE 1431 Waverty St., Pube Alde KNOKVILLE MINE, Napa Co., Hg

GARCIA, MARINO & KINSELA MURINEUM JAMES CREEK PLACER, Napa Co, Ng

QARESIO, ALBERT & Downleville Star Rt, Nevada City AETHA MINE, 4 mi W of Nevada City, underground, Au, Ag, Cu Under devel

GARIBALDI BROS Volcano GARIBALDI MINE, Ameder Co, Au

GARIBALDI, TONY
Box 146, Pteneur
EMELAINE QUARTZ MUNE, East
Belt dist, underground, Au
Idle

GARNET DIKE MINE King River Batchery Frommo MINE, Freezo Co, W

GARRETT, RALSTON & RALSTON Box 105, Johannesburg PIONEER MINE, E of Johannesburg, anderground, Au GRAV MILL

GEFGER, KARL.
Box 3138, Indio
DUPLEX LODE, Dale diet, Au., Ag

GENERAL DREDGING CO Natoma Partners: Giddings, Moisse & PLACER, 2 mi from Folsom, dragline, Au, Ag Edie GENERAL DREDGE #2, American Riv dist, placer, Au, Ag, Pb Edie

GEORGE, PRANCIS Cestiville BLACK HAWK MINE, Slahiyou Co, Cr

GEORGE, W K Sawyers Bar DRY GULCH MINE, Staktyon Co., Cr

GMEZZI & HARRY
158 Tunstead Ave, San Anselmo
LAZAR LODE, Mother Lode dist, Au

GIANT LEDGE LEAD &
COPPER CO, INC
c/o Edward E Wilhite, Sec-Tress,
927 Paim Drive, Colon
GIANT LEDGE GROUP LODE, New
York Mis diat, Ph. Cu

GIFFORD, HERB Rt 3, Box 358, Yume, Aris GRAY POINT #2 LODE, Cargo Muchacho dist

GILES BROS
Frederick & Daniel & Glice
Alleghany
GOLD CROWN LODE, Alleghany
dist, Au, Ag

GLADDING, MCBEAN & CO 2001 Los Feliz Blvd, Los Angeles Clay

GLASS MT VOLCOLITE CO Tionesta Owner & Pres: 16 W Free VOLCOLITE MINE, 4 mt M of Tionesta, sewifac, punica, sewifa Prod: 300 cu yda scoria Mine Supt. C C Jestey Foreman: James Jeskey

O4.ENN, ALBERT F Darwin, SILVER REID MINE, 18 mi N of Darwin, underground, Zn, Ag, Pb, Cu, As, Under devel

GLENN CO
3134 E 10th Sa, Onestand 1
Owner & Ges Mgp: George C Clean
Gen Supt. Harry Odgern
MARBLE SPRINGS MINE, 13 mi E
of Coulserville, under ground, An,
Ag, Pb
50-TOSE PLOT MILL.
Mill Supt. Frank Lane
Idle

OLIDDEN CO, THE Box 430, Resisting Press D P Joyce Gen Mgr, mag: E L Rabson Aust Gen Mgr, mng. Domald Odell Purch Agt: A R Gibersus BULLY HILL Milk E, Leise Shakto, under ground

GOBERT, JOHN
Box 202, Downieville
SUNSHINE PLACER, Downleville
dist, Au

OGEHRING, A A
Oasie, via Big Pine
KILROY MINE, Inyo Co, W

GOLD BAR MINING CO Box 10, Aimestie Mgr: Luke Copanich ALTA MINE, Mother Lode dist, Au Idle

GOLD HILL DREDGING CO
311 California St., San Françisco
Pres & Gen Mgr: J J Coney
Sec: L H Kerdell
Purch Agit E O Perkins
PLACER PROP on Mokelumna Biv
in San Josephe Co. Descletime, As, AgSupt: H L Coney
-fills

GOLDEN BEAR MING CO. 998 No Western Ave, Los Angoles 29 MT ALTA CHOUP, Pike (Indian Mill) dist, placer, Au, Ag. Idbs. GOLDEN STAR MINE
Box 206, Inyokern
Pres: Mrs Raigh Oriffen
VP: Mrs C W Wheeler
Gen Mgr: C & Wheeler
Gen Supt: R & Griffen
MINE, 14 mi W of Buyokern,
underground, WO3
Under shvet

GOLDFIELD CONS MINES CG. 1 Monagemery St., San Francisco. VP & Gen Mgr: E A Johian OMECA MINE, Nev Co, hydraulia, Au idle (See Nev)

GOOD HOPE MNG CG 130 "O" 15, Fresno Pres & Gen Hgr: I B Loughead MINE, 30 mt E of Tinells, underground Fred: 50 tons Under devel Mine Supt: Levi Pettenger 30-TON GRAY MILL MILL Supt: Clarence Pettenger

GOODHUE, J W
Tayloreville
PILOT MINE, Genesee, Plumas Co,
surface, undergd, &u, Ag, Cu
Under devel

GOODWIN, O F
WE Thompson, lowa Hill
TWENTY-ONE MINE, lowa Hill
dist, placer, Au, Ag

GONZALES, PAUL 1499 Pord Ave. San Jose WONDER MINE, San Benito Co. Hg

GORDON, L I 6742 1/2 Kraft Ave, North Hollysmand ORE HILL GROUP LODE, Cedar dist, Au, Ag

GOULD, H W & CO 1100 Mills Tower, San Francisco & Owner: Malcolm B Gould HELEN MINE, 6 mi SW of Middletown, Lake Co, Hg Under dwel (See Klau Mine, Inc & Arizona)

GRAHAM, CHARLES A 330 Alexander St., Nevada City SELBY HILL MINE, Nevada Co, An Idle

ORAHAM & CONLEY 1101 Winchester. Medford, Ore FRENCH HILL MINE, 6 mi S of Gasquet, surface, Cr Prod: 6 tons

GRANDVIEW MNG CO
Desert Center
OPEN PIT MINE, Desert Center
area, perilic
PYROPHYLLITE DEPOSIT, 17 mi
from Desert Center
Under devel
MERCURY TALC DEPOSITS, Wisse
Mountain area
Under devel
Conter devel
Under devel

GRANT & DAVIS

c/e Ersess V Grant, Juckson

HAGERMAN LODE & MALL, Rees
Belt dist, Au, Ag

GRANTHAM, LOUISE

1151 Council Ave, Ontario
RED EAGLE GROUP, Inya Co., Ag. Po.
BIG TALC CLAIM, Inya Co., tale

GREEN, SHERWOOD 218 S "D" St, Madera ACE PLACER, Madera Co, Au JENSEN PLACER, Frient dist, Au ACOSTA PLACER, Heldrith dist, Au

GUILDFORD GROUP,
GOLD MINES
BOX 181, Placerville
Owners: L. F. 5 Holland & McKinnes
POVERTY POINT, PRINTURA,
HUMMING, BALTEC, BANTAN,
ROSE ANITA MINES, 2-4 mi N of
Placerville, underground, Au

GUSTY, M. J. INADATIA PIRST LANDING, GOOD HOPE, ROCLAP POINT MINES, KAPA Co., W. HALL, ROBERT A
Box 86, Douglas City
AURORA PLACER, Trinity Riv dist

MARDISTY, R L
Box 172, Smith River
MT VIEW MINE, Del Norte Co, Cr
Idle

HARPER, S.L. Perick's Creek Ins. O'Brien, Ore ELK CAMP MINE, Del Norte Co. Cr Idio

MARRIS, MICHAEL
clo Purnace Creek Ranch,
Death Valley
KEANE WONDER EXTENSION
LODE, Chloride Cliff dist, Au, Ag
Under devet

MARRIS, P.L. clo Furnace Creek Ranch, Death Valley BLACK IRON LODE, Chloride Cliff dist, As, Ag Under devei

HARTMAN CONCRETE
MATERIALS CO
Box 1632, Bakersfield
FOX PLANT GRAVEL PIT, Kern
Riv (Bakersfield) dist, gravel
plant, Au, Ag

HARVEY, RAY
Box 95, Bishop
SANTA CLAUS MINE, Inyo Co. W

MATCHER, DAVID & ASELTINE, WM Yreka BLACK JACK MINE, Stelsyou Co, Cr

HATTON, R C 1104 W 99th St, Loe Angeles MINE, Agua Caliente dist, Au, Ag, Cu, Pb, Zn Isibe

HAVILAH MNG & MLG CO 1314 N Highland, Hollywood BASIN VIEW MINE, Kern Ce, W

HAZEL CREEK MNG CORP
463 Main St, Placerville
Mgr: G W A Irvine
LODE MINE, E Belt dist, Au, Ag, Po

MEATHER, HARRY P 236 So Qak Knoll Ave, Pasadena BRIGHT OUTLOOK MINE, San Bernardino Co, W

BIEINS, TED 1251 Nancy St. Barstew BLUE BELL BINE, Soda Lake diat, Pb. Au, Ag. Cu 1dle.

HELMKE, THOMAS &
JANSSEN Amrhel'St, San Francisco
LAMBERT MINE, 5 mi NE of
Magalie, underground, Cr
Frod: 50 toms
Mine Supi; Claude Wolgamoti
100-TON GRAV MILL
Mill Supi; Dorner T Schweler, Jr
Foreman: Gary Orton

HENDERSON, P M 1568 No Orange Grove, Pomona ELNORS MINE, Inyo Co, talo

MERBERT, O A
BOX 67, Plymouth
WOLIN PROPERTY, Mother Lode
dist, placer, Au
idle

MERBERT MINES
HIS. Box 150A, Porterville
TUNGSTEN MINE, Tulare Co, W

HERMANN, ET &
KELLAR, GEO
BOR B, Thermal
H & K MINE, Riverside Co, tale

HESS, MARTIN L
Box 931, Weldon
GLORY HOLE & TUNGSTEN
QUEEN, 14 mis of Weldon,
surface, W
Under Sevei

MIBSPSHMAN, JAMES MI Bullion WOOD PROPERTY, Chowchilla Riv dist, placer, Au

HIDDEN FORTUNE LODE
Owner: John Lorang, 878 55th 84,
Oakland
Lesses: Harry Gibson, Box 51,
Callantina
MINE. East Belt dist

HIDDEN VALUE TUNGSTEN CO 2700 Budiong Ave. Los Angeles HIDDEN VALLEY MINE, San Bernardino Co. W

HIGH PEAK TUNGSTEN MINE Bishop

HIGHTOWER, CLINTON
PO Box 713, Central Valley
PLAIN VIEW LODE, Av. Ag
BLACK RODE LODE, Av. Ag

HITCHCOCK, JOHN S Glenville HILLSIDE MINE, Kern Co. W

MOEFFLER, I W
Box 34, Crescent Mills,
Plumas Ce
DAG-LAN MINE, underground, Au
20-TON GRAV MILL

HOERNER, OSCAR Newberry CLJPPER MT MINE, Kera Co. W

BOLIDAY, ELMER Gen Del, Madera CASAURANG DREDGE, Madera Co, placer, Au

HOLCOMB, W E Nevada City SLEEPING BEAUTY LODE, Washington diet, Nevada Co, Au, Ag

MOLLIDAY MINES
433 "J" St. Crescent City
MINES, Del Norte Co, Cr

HOLMAN, J. R.
1405 E. Orange Grove Ave, Pasadena
MISTAKE MINE, 20 mi W of
Coalings, surface, Cr
Prod. 50 tons
Gen Mgr: J fl Holman
Mech Engr. H. A. Pimlott
0-TON GRAV MILL, White Cr
Mill Supt. Clem Baker

BOLMESTAKE MNG CO
BOX 308, WINTERPAYER
Pres & Gen Mgr: K A Holmes
Asst Gen Mgr: Les Hardy
CARGO MUCHACHO GROUP,
Imperial Co
Hille
CASTLE DOME PLUORSPAR,
Imperial Co
120-TON FLOT MILL, 4 mi W of
Winterhaven
Mill Supt: James G Hardy
Assay: Harvey Hardy
(See Arizona)

HOMESTAKE MNG CO 100 Bush St, San Francisco (See So Dah)

HORNER, W S
BOS 1135, Lodio
BLACK EAGLE LODE, Engle
Mt dist, placer, Pb, Au, Ag, Cu
EAGLE M

HORSE SHOE MINE
Box 21 "B", Casadero
HORSE SHOE LODE, Mother Lode
dist, Au, Ag

HORTON, V K
Rt I, Don 361A, Modesto
VICTORY MINE, Presno Co, W

HOSTETTER, EDWARD J Heleva BIO FLAT PLACER, Trinity Riv

NOWELL BROS
c/o Leonard L Howell
Bos 73, Raymond
DREDGE operating on Hai Williame
Ranch, Chowchilla Riv (Raymond)
dist, Au, Ag

HOWIE MINING CO Rm 200, 200 S Beverly Dr. Beverly.Hills Pres: Robert Hodge Gen Mgr: Ross Prout HOWIE GROUP MINES, Nevada Co, underground, placer, An 148s

HOWLAND, W P 445 K St, Taft HOWLAND MINE, Monterey Co, Hg

HUGHES-VERTIN LIME CO
Box 231, Auburn
Pres: Cyril Vertin
Gen Mgr: Frank Cerney
Asst Mgr & Chief Engr: H S Dahlman
Gen Supt: Vaughn Stone
MINE, 6 mi 8 of Auburn, surface,
CaO
Fred: 200 tone
65-TON CALC MILL, Rattlesnake Br
on Amer Riv
REFINERY, Rattlesnake Br
Prod: 24,000 tons

HUGHES, PAUL O'Neals MT VIEW-LAST CHANCE-LODE, Hildreth dist, Au, Ag

HUNTER.

HUNTER, BEV
Olancha
LEMOYNE CLAIM, Inyo Co, Ag. Po

HUNTLEY INDUST MINERALS
BOX 305, Bishol
Pres: W Huntley
Sec-Treas: L C Hummel
PACIFIC PYROPHYLLITE MINE,
18 ml hw of Bishop, surface,
asbestos, clay, W
Foreman, D T Davis
Prod: 100 tons

HYLAND, GEORGE Alleghany IRELAN MINE, Sierra Co, underground, Au

IDAHO MARYLAND MINES
CORP
Box 1028, Grace Valley
Pres & Gen Mgr: Bert C Austin
VF & Acat Gen Mgr: Max Bechhold
Sec. C L Alian
Elec Engr. Edward "M White
Mec's Engr. Joseph Glennon
Safety Engr. Joseph Glennon
Safety Engr. Josh Clark
IDAHO & BRUNSWICK MINES,
1-2 1/2 mi NW of Grass Valley,
underground, Au, Ag
Prod. 450 tons
Mine Poreman: D W Henry
Mine Engr. E C Whiting
600-TON FLOT CYAR MILL
Mill Foreman: Oliver-Peterson
Assayer: Otto Ellerman

IGO MINING CO
BON 1412, Redding
Press. R B Tupper
Gen Mgr: M E Hawe
BMG WYKE MINE, Igo, Au, Ag, Fb, Zn
YANKEE JOHN MINE, Au, Ag, Fb

INDIAN GROUP MINE
104 Walsh, Grass Valley
Pres: R R Lewis
MINE, 15 mi NE of Nevada City,
underground a placer, Au
Under deveil
28-TON GRAV MILL

INDUSTRIAL MINERALS & CHEMICAL CO
6th and Gliman Sts, Berkeley
MINE, Nevada Co, grinding, barite
CLAY PITS, Inyo Co, barite

INTERNATL METALLURGICAL.
CHROME CORP
1028 Chorro St. San Luis Obispe
Prest: 5 J Herman
VP: G Bartot
Gen Mgr: W B Arnees
Sec: Leo B Lebovits
NORCROSS MINE, 6 mi NW of San
Luis Obispo, surface, CP
Londer devel
150-TON CHRAY MILL
Foreman: 13 J Froncy

INYO MARBLE CO
T26-732 E 29th St. Los Angeles 11
Pres: R. D. Penny
VP: D. H. Dunn
Sec: G. W. Mead
Treas: A. W. Thompson
CONS INVO PROPERTIES. Dolomite
via Lone Pine, surface, marble
limeatione & dolomite
75-70N GRAV MILL
Supt: D. H. Dunn

INYO MINING CO 2702 Glendale Blvd, Loe Angeles VICTOR & VICTORIA MINES, Inyo Co, W

INYO SOIL SULPHUR CO 310 Pacific St, Bakersfield CRATER CLAIMS, Inyo Co, S

ISABELLA MINING CO Webson

ISABELLA TITANIUM MINES, INC Box 383, Tujunga MINE, Los Angeles Co, Ti

IVES, E E Box 774, Big Pine CLEVELAND MINE, Inyo Co, Au, Ag

J & W MINING CO
Corvaille, Ore
Press: Norman Johnson
Sec-Treas: Chas 5 Wilson
TYSON CHROME MINE, Gasquot,
20 mm NE of Creacent City, underground, surface, Cr
Prod: 45 tone
Supt: William Whippo
Cons Engr. K O Watkins

JACKSON, R H
BOX III2, Midpines
EARLY MINE, Maripoea Co, W
MEXICAN DIGGINGS MINE,
Maripoea Co, underground, Au
Under devel

JANZEN, PETER
Gasquet
CHROME HILL, ELK CAMP,
Patrick's Cr. Butte Co. Cr

JENSEN, ANTON M Initia PROSPECTUS LODE, Chuchawalia dist, Au

JOHNS - MANVILLE 22 E 40th St, New York 16, NY LOMPOC MINE, Lompoc, surface, diatomaccous silica (See East)

JOHNSON, JESSE Gen Del, Redwood City ALMA CLAIM, Washington dist, placer, Au, Ag

JOHNSON, LANCE La Porter WINIFRED MINE, Poker Plat dist, placer, Au, Ag Lillie

JONES, ANDREW B
Box 284, Columbia
HIDDEN TREASURE LODE, Mother
Lode dist, Au

JONES, R D 416 Henderson St, Grass Valley JUDE LODE, Washington (No Bloomfield) dist, Au, Ag

JONES-THOMPSON, RAYMOND Box 171, Barstow TUNGSTEN KING & MOONLIGHT CLAIMS, San Bernardine Co, W

JORDAN, ROBERT C Box 277, Ahwanee JORDAN DREDGE, Mariposa Co, Au

JOUBERT PLACER MINE Sawyers Bar Owner: Louis J Joubert HYDRAULIC PLACER, Au, Ag (Leased by Strawacker & Hartnett) Effic

JUDGE BYDRAULIC MINE Sawyers Bar PLACER, Siskiyou Co, As JUNIPER MINE Box 76, Baker 40 mi NE of Baker, Fluoropar, Pb, Ag

JUST ASSOCIATES
726 Story Bidg, Los Angeles
MINE, San Bernardino Co, W
idle

KAISER ALUMINUM &
CHEMICAL CORP
1924 Broadway, Oakland 13
Press: Henry J Kaiser
VP: D A Rhoades
Aust Gen Mgr. F M Cashin
Elec Engr: Leo Uphoff
Gen Supt: J F Knight
Geol: E A Hasuan
Mach Engr: J E Winter
Purch Agt: A V McLeod
NATIVIDAD PLANT, Box 1531,
Salinas, surface, dolomite
Supt: D M Kerr
Asst Supt. Ivan Hall
HEAVY-MED MILL

KAISER STEEL CORP

1924 Broadway, Oakland i3
Pres: Henry J Kaiser
Eusc VP: E E Trefethen, Jr
VP & Gen Mgr: Jack L Ashby
VP, Oper: G B McMeans
Supt, Raw Materials: K B Powell
Supt, Metall Dept: M Lauderback
Works Mgr: B N Dagan
Purch Agt: G W Kelly (Oakland),
D B Kitchell (Fontana)
EAGLE MT MINE, Box 15s, Eagle
Mt, 60 mi E of Indio, surface, FeProd: 0, 250 tons
Mine Supt: J O Burgess
Mine Foreman: W A Hortom
Mine Engr: George Huseman
6,000-TON HEAVY-MED MILL
under constr
Asst Supt: C W Reso
1, 300,000-TON BLAST FURNACES
Asst Supt Iron & Steel): C R Lohrey
Furnace Supt: J D Saussaman

KALBAUGH, CLAYTON
FRM Way, Redding
THURSDAY & MINE, Cirmabar dist,
placer, Au, Ag, Cr

KANE, GROVER
Box 123, Randsburg
OPERATOR CONS LODE, Randsburg
dist, Au
Idle

KEANE EXTENSION MMG CO Box 224, Beatty, Nev Owners: Michael & James Harris MINE, Death Valley, Inyo Co, underground, Au, Fb, Fe, Ag SMELTER, lead & Iron Under deveil

KELLY, T C Hayfork KELLY MINE, 5 mi NE of Hayfork, underground, Au, Ag Under devel

KENNEDY MINERALS CO, 18C 3552 E Olympic Blvd, Los Angeles 23 ECLIPSE, WARM SPRIMGS, KATZ, Los Angeles Co TALC AND DEATH VALLEY, Inyo Co CLAY PIT, Inyo Co, clay

KENYON, HARRY B
Box 149, Cottonwood
MUMMINGBIRD MINE, Shasta Ce,
underground, Au, Ag
(Leased from Joseph Oiles,
Cupertino)

KEYSTONE COPPER CORP (Formerly Lava Cap Gold Mag Corp) Box 7, Nevada City MINE, Nevada City, As, Ag Idle

KEYSTONE MINE
Agent: M G O'HANLON for
Martin Ares, Sutter Creek
KEYSTONE LODE, Mother Lode
dist, Au, Ag, Cu

KIMBROUGH, R C 8804 Compton Ave, Los Angeles 2 SUNRISE GP CLAIMS, San Bernardino Co, Au, Ag, Selinium Under devel BILLIE CLAIMS, 12 mi N of KING & HOFFMAN Box 583, Big Bear Lake LUCKY 13 GP, 8 mi NE of Ore Grande, underground Idle

KING SOLOMON LEASE e/e E B Aukinson, Bos 101 Johannesburg YELLOW ASTER MINE, Kern Co, emderground, Au, Ag MILL, Randsburg dist

KIRBY, CLYDE & THOMAIN, GENE Sawyers Bar THOMAIN MINE, Salmon Riv dist, placer, Au, Ag Idle

KIRK PATRICK MINES CO
390 Munroe St, Sacramento
Press: Chas G Johnson
Gen Mgr: G W Johnson
Sec: E C Royer
Gen Supt: M Svetich
BURKPATRICK NO 2 MINE, 6 md S
of Downleville, underground, Au, Ag
Prod: 10 tons
Under devel

KIRTCHING, R E Box 783, Big Pine CRATER GROUP, Inyo Co, S

KLAU MINE, INC
1100 Mills Tower, San Francisco 4
Pres: Malcolm B Gould
Sec-Treas: B A Gould
VIRGILIA & STANDART MINES,
Plumas Co, Au
1888
KLAU MINE, San Luis Obispo Co, Hg
1886
(See H W Gould & Co)

KLONDYKE MNO & MLG CO e/o Edward Benefiel Box 103, New Pine Creek, Ore KLONDYKE GROUP LODE, High-Grade dist, hiedec Co, Au, Ag Under devel

KNEPPER, L W Idria NORTH STAR MINE, San Benito Co, surface, Hg

KNOXVILLE MINE Monticello Owner: G E Gamble & W V Wilson MINE, Monticello, Ng FURNACE

KOEST, GEO W Box 85, Darwin ALLIANCE & SILVER DOLLAR MINE, Inyo Co, tale

BORFIST, JERRY Bon 75, Baker CRE FINE MINE, 12 mt E of Baker, underground, open cut, Au, Ag Under devei MINE, 33 mt NE of Baker, underground, Ilmoreper Under devei RETORT MILL, near Baker

K P F & F MINING CO Redding

KRETA, JOHN M Box 251, Randaburg BIG GOLD AND TUNGSTEN, Kern Co, W

KUBON' & JURVA 419 N Emily, Anaheim RAND MINE, Kern Co, Glenville, W idle

KUNDEL, J H
Box 5, Trona
GOLD TREASURE LODE, South
Park dist. Au. Ag

LA COLORADO MINE c/o J M Mueller, Winterhaver LA COLORADO LODE, Cargo Muchacho dist, Au, Ag, W

LA GRANGE GOLD DREDG 1803 Mills Tower, San Francisco of Pres: Henry Elckhoff, Jr Sec-Treas: Jefferron Koolittle PLACER, La Grange, dragline, Au, Pt, Ir LAKE COUNTY MINERALS, INC 2321 Waverly St, Oakland MiNE, Kelseyville, Lake Co, S idle

LAKEVIEW MANGANESE MINES Croscent Mills, Calif .STAR MINE, Plumas Co, Mn

LAN1, VICTOR-R Lone Pine PENNSYLVANIA LODE, Cerro Gordo (Swannea) dúst, Zn, Pb, Au, Ag

LANSDEN, JOHN A 258 Orange St, Auburn LANSDEN DREDGE, Auburn dist, placer, Au, Ag Idle

LARRIEU & WALKER c/o J E Larrieu, Fenner HACKBERRY (DENVER) GROUP LODE, Signal diet, Au, Ag Idie

LARIOS, JOE P
Box 76, New Idria
SAMSON PEAK MINE, San Benito
Co, Hg

LAURIDSON, LAUREN C Rt 2, Box 1340, Pair Oaks JAMES O'BRIEN MINE, El Dorado Co. placer. Au

LAWSON, A & E KLAERS
3305 Arrowhead, San Bernardum
TARANTULA LODE, Silver Mt
dist, Au, Ag

LEE, FRED R 4365 New Jersey St, San Diego NORTH STAR MINE, W

LIDDICOAT GOLD MINES CO RIA, Box 27, Greenwood Pres: J L Liddicoat VP: L G McClain Sec: Liliue Liddicoat GRIT MINE, underground, Au Engr. J F Siegfried 60-TON GRAV FLOT MILL

LIGHT HOUSE M & M CORP Box 306, Baratow MINE, San Bernardino Co, W

LINCOLW CLAY PROD CO INC
Box 367, Lincoln
Pres. M J Dillman, Jr
VP N S Brown
Gen Nigr & Purch Age: A S Gulliford
Bec. W J Crosby
MINE, 11/2 m N of Lincoln, open
pit, Fireclay
MILL

LINKHARD, R &
MESSENGER, E
Kirby, Ore
CHROME MINE, Siskuyou & Del
Norte Co

LIPPINCOTT LEAD MINES
BOX 1811, Santa Ana
Owner: George Lippincott
LEAD KING MINES, Death Valley,
Ag, Pp. Zn
Prod: 50 tons
Supt. Gene Taylor
25-TON GRAV FLOT MILL, furnace
Bupt: Neuman Blek
SMELTER, Bonnis Clare, Nev

LITTLE, J Q
Clark Mt Station, Nipton
CARBONATE KING MINE, San
Bernardino Co, Ag. Pb. Za
Idle
(Owned by Crystal Cave Mining Co)

LITTLE, ROBERT
Rt 1, Box 76, Downieville
MARY MANE PLACER MINE,
Downieville dist, Au, Ag

LITZ, IRVING M & SILVER, JOSEPH 6665 Wildhire Bivd, Beverly Hills KALLY MINE I ODE, Clark Mt dist, Pb, Zn, As, Ag, Cu LIVE OAK MINES, INC Sand Canyon, Rt., Saugus Pres & Gen Mgr: Challoner Thompson Counsul. HC Ellis MINES, 12 mt SE of Saugus, surface, ilmenite, magnetite, sirconium Net: 5 Sklarew Under devel

LLEWELLYN, LLOYD Box 63, Ridgecrest DAN PIER MINE, Rademacher dist, tode

LOG CABIN MINES CO 431 W 7th S4, Rm 836, Los Angeles Gen Supt: F C Cassidy LOG CABIN MINE, Leevining, Au, Ag 150-TON AMAL CYANIDE MILL 1818

LONG, J H
Box 185, Victorville
GOLD BUG LODE, Beliville dist,
Au, Ag

LORBNIZ & SWINGLE Plymouth Mgr: C J Lorents LORENIZ EXT PLACER, Cosumnes Riv dist

LORENZ, WOODY J
Box 364, Lone Pine
Big FOUR LODE, Wildrose dist,
Pb, Zn, Ag, Cu, Au

LOVE, DONALD F Ludiow, Box B BAGDAD-CHASE MINE, 4 mi 8 of Ludiow, underground, surface, Au, Ag, Cu Met: Jaimar & Jackson

LOW, P GILMAN
Box 224, Ahwahnee
NEW DEAL MINE, Au, Ag

LUCKY GOLD HILL CO
(48 Gray Ave, Yuba City
Pres: 18 Everett
VP: Chartea Lavis
Sec-Treas: Harold Lindstrom
Gen Mgr: Harry Garner
LUCKY GOLD HILL GROUP, 9 mi
S of La Porte, placer, Au
400-TON MILL, under const

LUNDY, COL C A
Blaireden
JAMISON GROUP LODE,
Johnsville dist, Au, Ag
idle

LUNIUM CO
Box 582, Auburn
Owner: W B Shepherd
Gen Mgr. Jack Woppe
Sec: W N Vision
WHITE ANGEL GP, 24 mi N of
Monucello, underground, Cr
Prod. 8 tons
30-TON GHAV MILL, Box 92,
Monucello, M

MACCO CORP, BARITE DIV 14409 S Paramount Bivd, Paramount BUCKHORN MINE, Kern Co, clay (See Ariz)

MACHEN, H E North San Juan BRIDGEPORT MINE, Nevada Co, Au idia

MADER, LAURENCE J Box 350, Grass Valley W MC PLACER, Nevada City dist, Au

MADISON, MRS H E Woodleaf Star Rt, Forbestown EL SEGUNDO PLACER, Forbestown dist, Aw, Ag

MAGRE MERCURY, INC
403 Piedmont St, Cakland
Pres: If Mages
VP & Engr: B C Austin
See: H B Rucker
MINE, Guerneville, Hg
Mgr: T A Monshan
108-TON ROTARY FURNACE

MAIN, M L.
Box 617, Weaverville
HICKEY PLACER, Trinity Riv
dist, Au, Ag

MARALL, LS & V H CHROME MINE, Placer Co, Cr

MARRIE TUNGSTER MIPE MINE, 13 mi SW of Bishop, W Supt: A H Peterson & John Utter Under dexel

MARIA, ELI J Mt Buillion
SPECIMENT LODE, Mother Lode
dist, Maripesa Co, As, Ag

MARKON, ALEX Savyers Bar ANNA JOHNSON & SURPRISE LOGE, Salmon Riv diet, Au, Ag

MARKS, LESTER, SMIELDS, JOHN A & MARKE, D.E clo Placer County Bank, Auburn JOSEPHINE LODE, Mother Lode

MARQUIS MINE IlS Ericson Rd, San Marpo Opr: J M Marquis MINE, Calaverso Co, underground, Au Under devel

MARYEN & MARTEN Box 551, Burstow FAIRVIEW MINE, San Bernerdon

MARTER MINING CO
i43 N Rosemont Blvd, San Gabriel
Pres: L B Martin
Gen Mige: R M Richter
MARTER-WHITE MINE, San
Bernardino Co, surface Prod: 500 tons LUCERNITE MINE, Son Bernardino

MARTIN & KREBS 145 W Hillcreet, Monrovia MINE, Tulare Ca. W

MASSERA, E P Star Rt, Nevada City COMET PLACER, Nevada Co, Au

MASTOLIER, & Tuler Rt, Nevada City SALMON MINE, underground, Au Under devel

MATHERLY, ELLIS B Lotus c/o W C Matherly, Box 84, Davenport, Wash MATHERLY DREDGE, Mother Lode dist, placer, Au, Ag

MATTHEWS, PEARCE & Hollister ANTELOPE MINE, 33 mi SE of Hollister, underground, Cu

MCALLISTER, H F BLUE SILVER LODE, Cu, Ag, Au

McBROOM, E A Cectivitie
PARNSWORTH PLACER, Salmon
Riv diet, Au, Ag
Ella

McCLENDON, C N
Best 61, Crescent Chy
BUCKSKIN-FOURTH OF JULY
MINE, Cr

McCREE, M E French Corral MADRONE CLAIM, French

McCULLEY, JOE BOR 53, Darwin EMPRESS MINE, 8 ms E of Darwin, underground, Ag. Po, En, Ca Prod: 50 tome 59-TON GRAY MILL, 7 ms E of Mill Supt: Grant Crow

Malaughlin CORP Mine, Trinity Co, Mn

MaWHORTER. E Rt 1, Bishop JIMMIE LINDA MENE, Inyo Co, W

MEANS, L. R. Box 717, Yrelan OSGOOD MENE, pincer, Au

MEGRAN, J J Denny HIGHLAND MINE, Trinity Riv dist, placer, Au, Ag bills

MENGIN, PIERRE & JOHN Box 184, Nappy Camp PATSY PLACER, Klamath Riv dist, Stakiyou Co, Ac, Ag

MERIAN, A T Strawberry Valley JUMBO MINE, Plumos Co, Au Litte

MEKRICK, E P 113 N Riverside Ave, Medford, Ore ALLISON MINE, Siekiyou Co, Cr

MERRICK, R C 4632 47th St, Sacramento LOST CAMP PLACER, Blue Canyon diet, Au, Ag

MID-STATE DREDGING CO c/o A A Hammer, Douglas Flat TOBIA GRANITTA RANCH, East

MILLER, GRORGE & JOHN-Bux 681, Sesera COLDEN STAR LODE, E Beld

MILLER, J P
Box 465, Lucerne Valley
DOUBLE EAGLE LODE, Lava
Bod dat, Ft. Br. Au, Ag. Cu

MILLER & WARDKEN MILLER & WARRENE Lone Fure Gen Supt: Louis Warnhom, Jr Goot: D. Dawie DURHAM & FERNANDO BRINES, Darwin, 3 m: SE of Darwin, underground, W. scheelite Mine Supt: Minck Tilley 109-709 GRAV MELL, 4 mt E of Mill Foreman J W McCully

MINERAL MATERIALS CO 1145 Westminster Ave, Albamber Partners: A S Vianeli & Clair W Dunion

Dunton
Sec: N Vincount
Geol: M W Redhead
Gen Sught: R J Hall
Engr: Thomas J Thorne
ATLAS SILICA MINE, 2 mt E of
Oro Grande, surface, edition
Prod: 780-1,000 tons
Mine Foreman: C R Mangs
VULCAN IRON MINE, Relao, Pe Frod: 1,000 tons SILVER LAKE IRON MINE, Box 63, Bakers, 20 mt N of Baker, surface,

Under devel
Prod: 780 tons
VICTOR PYROPHYLITTE MINE,
San Bernardino Ce, talc
(See Nevada)

MINING DEVELOPMENT CO e/o Stanley Wolfersdorf RII-B. Berstow WAR EAGLE GROUP LODE, Lead Mt diet, Pb, Au, Ag

MINONA MINING CO c/o Elmer L. Pahton, Supt Rt 2, Bon 1266, Grass Valley ESPERANCE MINE, French Corral diet, placer, Au, Ag

MITCHELL, STEVERS & Randsburg CALIF CLAIM, Kern Co, under-ground, Au, Ag

MODRELL, GLENN BROWN PROPERTY, Mol

MOHLWE MINES, INC Pres: T W Peterse VP: Lorin Reber

Soc & Gen Mgr: S C Greenwood Treas: R N Day MOHAWK MENE, 65 mt S of Les Vegns, underground, surface, Fb, Cu, Ag, Zn

MOLYBDENUM CORP OF AMERICA OF AMERICA Ant Cen Mgr: Russell Weed Actual: A M Wilson MT PASS MINE, Najion, 60 ml 3W of Las Vegas, New, underground & surface, rare earth metals, barite Fired: 330 tose Mine Supt: John Martin 150-TON FLOT MILL Assayer: John Cerr Assayer: John Carr Mill Supt: G H Les (See Colo, New Mex & East)

MOJAVE MNG & MLG CO Mojave CUSTOM MILLING, Au, Ag

MONUMENTAL MINES 520 F St. Eureka Opro: Matthews & Netson MiNE, 7 ms W of O'Brien, eurface, Au, Ag Idle

MOONLIGHT MINING CO MINE, Mariposa Co, undergd, Au

MOONLIGHT MINES OREGON W M Smith, R E Powell & P C Feisch, L5 E St.
No Lakeview, Ove
MOONLIGHT GROUP LODE, IM
Grade dist, Modoc Co, Ass, Ag

MORGAN GOLD MINING CO Georgetown Mgr: George P Morgan MINE, Garden City, Au Under devel

MORNING GLORY MNG CO 201 So Irving Blvd, Los Angeles 4 MORNING GLORY LODE, Wild Rose dist, Ag. Cu, Pb

MORNING STAR MNG CO c/o George L Gary, Byington Bldg, Reno, Neveda MORNING STAR LODE, Monitor diet, Au, A_d

MORRIS RAVINE MNG CO Box 7, Oroville Pres & Gen Mgr: J H Sharpe VP: Roy A Hundley Sec. J R Peterson MINE, 6 ms NE. of Orewille, underground, Au underground, Under devel

MORRISON, W D
Box US7, Yuma, Arisona
LITTLE BUCKARGO LODE,
Paymaster diet, Pb, Ag

MOUNTAIN COPPER CQ, LTD
230 California St, San Francisce 4
Gen Mgr: LT Met.
Anst Mgr: JG Huseby
Purch Agt: S D Dodds HORNET MINE, 15 mi NW of Redding, underground, Fe Prod: 400 tons Gen Supt: C W McCleng Foreman: H Calhoun Engr: Albert Pare HORNET CRUSHING PL

MOUNTAIN GOLD DREDGING

CO Sutter Creek Pres: M J Garibaldi PLACER, 2 mi E of Valley Springs, dragline, Au Mech Engr: Bill Teller

MT DIABLO MINE 2106 Tower Petroleum Bidg, Dalias, Texas MINE, Contra Costa Co, Mg Ender desei

MT GAINES MINING CO Hoscows 60-TON AMAL FLOT MILL, As, Ag Mgr: J L Dynan Mine Foremen: A J Meagher Mill Foreman: C S Guest Assayer: T W Molthen Idle MT SHASTA ASBESTOS CO EDDY CREEK MINE, Sharts Co

MT STATES URANIUM CO RED HILL MILL, W

MT VIEW LEAD MINE Independence Mgr: Pritchett & Slates MINE, Inyo Co. Ag. Pb

MULTI MINES, INC 2550 E Olympic Blvd, Los Angries 23 MINE, Los Angrice Co, tálc

MUTH, TED Somes Bar RIVERSIDE PLACER, Sicklyou Co, Au

NAT'L LEAD CO, BAROID SALES DIV 2404 Darville, Houston, Texas HECTOR MINE & PLANT, Newberry, underground, bestonite Sup: Jack Hereford
MERCED Mill., Merced, dry
grinding of barytes
Sup: Les Basch
(See Misseuri, New, Yez, Central)

NATOMAS COMPANY NATOMAS COMPANY 607 Perum Bidg. Secremento Pres & Gen Mgr. R G Smith VF: Leuis Secter Sec. Wandscher Assi Gen Mgr. Cyril Thomas Gen Supi: Calvis Sears PLACER MINE, 36 mi E of Secremento, 6 bucter drefges, Au Proc. 65, 600 cs yés User Colorado and Heweds)

NELSON, FRANK RIL, Dishep WESTWARD EAGLE & LODE, Fish Springs dist, Au, Ag, Pb, Zn

NELSON MINE Box 124, flereta Opr: Dayton Murray PLACER MINE, 6 mi W of Orleans, Au

NEWA MINING CORP 3433 W 64th St, Seattle, Wash ROGERS-GENTRY LODE, Neenach Au, Ag MILL

NEW CHAMPAGE MARSEG CO West Fulled CENTENNIAL MENE, underground, Au, Ag. Po Supt: H G O'Hanlon, Jr FLOT MILL Supt: R H O'Hanlon lile Dean Aghetti

NEW ERA MHG & MLG CO Big Pine Mgr: W C Neve NEW ERA MONE, Inye Co, under-ground, Au, Ag jdte

NEW IDRIA MIMO & CHEM CO
58 Sutter St, San Francisco 4
Pres: Charles F Parker, Jr
VP: EL Elitota
VP & Gen Mgr: C Hyde Lewis
Sec & Purch Agt: John E Meyora
Gen Supt: Wesley Shaddach
Geoll: Richard Pharmada
New IDRIA QUICKSILVER MINE,
Idria, San Beniso Co, 105 mi SE of
San Freecisco, underground, Hig
Prod. 260 time
Mine Supt: C Hyde Lewis
Mine Foreman: Wee Shaddach
400-TON Mill.

NEW JAMISON MINE Mgr: C H Smith LODE & PLACER, Johnsville dist

NEW PENN MINES, INC Camp Seco
Pres: B F Playter
Sec: J H Nichalls
Gen Sugt: W F Criswell
PENN MINE, 1 mi W of Camp Seco,
Cu, Zn, Ag, Fu, Au
Under Sevel 200-TON FLOT MILL

MINING WORLD

NEWMAR, OTTO & SORS Rise L. Personal River Colicul LOOK, Michigan Bluff dat, Au, Ag MILL

NICHOLS MIMB c/o C G Scharft, 594 M Main St. Blahop

NORTH WESTERM MINING CO Box 200, Seatle, Wash Owner: Afred W Peelar HOULDER CULCH CHOOM, Stattgee CO HYDRAULE PLACES, Suvyere Bar, As Sup: Richard T Beed 160*

OAK HILL MINES c/o William C Wolfe, Rt 2, Box 1710, Grace Valley MINES, Au, Ag

OCCIDENTAL MINING CO & ORO MINING CO CO LA Anderson, Porcettilla OCCIDENTAL MINE, Joseph Hills diet, placer, Au. As

O'BONDELL, JOHN EM E Main St. Coune Valley KATE HARDY MINE, Serve Co, underground, Ac BALL MELL

OLIVER, L. E Sawyers Bar ANNA JOHNSON LACER, Salmen Riv dist, Au, Ag

ONTOP MINE
Meadow Valley, via Quincy
Owner: He Fraville
MINE, 8 1/2 mi S of Bucke Lake,
underground, Aus. Ag
Under davet
6-TON GRAV QUARTZ MILL

OREGON GULCH DREDGING CO c/o Ernest P Smith, Ft Jones LA GRANGE MINE, Trinity Siv dist, placer, Au, Au, Ag

ORO FING COME MINES CO Box 432, Auburd Pres: O A Nugent Tress: JC Kempyanee ORO FINO MINES, 4 ms from Amburn, underground, Au, Ag Life

ORIGINAL 18 TO 3 MENNE, 185 C
1611 Ruse Bldg, Sen Francisco 4
Pres: A N Lewis
Sec: Jack Maxifeld
Gen Supt: C A Bennets
MINE, Alleghang, An, Ap
Furermass: W Y Van Dorum
156-TOS CONC & AMAL FLAFT
MIN Forename, JB Bushing

OWL SPRINGS CO
1079 Leighton Ave, Los Angeles 37
Pres: Harold W Orwig
Sec: George Orwin
MANGANESE MINES, See Bernardino
Co, unferground, curface, Ma
Assay: Edward Elsenhauer, Je
50-TON CONC & HINTERING PL

PACIPIC CLAY PRODUCTS CO 306 W Ave 25, Lee Angeles M Pres & Gen Mgr: J D Frederichs VP, research: M C Brown Sec: J C Culhane Safety Engr: J M Micek Purch Agt: R M De Pray PITS, Amador, Caloreria, Granga, Rivereide & Sun-Jooquin Counties, clay

PACIFIC COAST AGGREGATES
400 Alabama St, San Francisco
ROCKFIELD GRAVEL PLANT, Prince
diet, Au, Ag. cond and gravel

PACIFIC COAST BOBAX CO.
DIV OF BOBAX COMSOL, LTD
630 Shatto Place, Los Angeles &
Pres & Gom Mgr: IM Geretley
VP & Asst Gen Mgr: P J O'Brises
Gen Supt: It L Pusby .
Safety Engir: L F Clegg
Purch Agt. J C Walker
BORON MINE, S in E of Mojawe,
underground, borate oras

Mine Supt: W M Wanneley Acet Mine Supt: P A Conte Under devel BORON MILL Mill Supt: E D Lemon Acet Mill Supt: G G Vary

PACIFIC MINERALS CO, LTD 337-3045 R. Richmond Pres: C L Renwick, Jr Sec: TH DeLap PLACERVILLE & SHIPGLE SPRING MINES, asphalt, scapajone, elate roofing grammale Mine Supti d'B Bishop MILL Supti Se Bishop

PALO ALTO MNG CORP.

\$21 San Tomme Rd, Cassebell
Free: F H Smith
VP: S S Ridgely, Sr
Gen Mgr: G E Carlson
Sec: K R Dixon
MINES, Manta Clara & Alameda Co,
surface, Cr
Proc. 180 hum
Mine Shet: S S Ridgely, Sr
50-TON GRAV MILL, 6 mi S of
San Jose Coyote Rd
Mill Supi: O E Carlson

PANOCHE VALLEY
QUICKSILVER MINES
BOX 31, Patcines
LONE OAK & VALLEY VIEW MINES,
San Benito Co, Hg

PARKER MNG & MLG CO
Box 202. Barstow
Press: PA Parker
VP: J C. Porter
Sec-Treas: H T Parker
Geol: Emgene Lawrence
Engr: Wade Whaley
WHITE DOLLAR MINE, 14 mi 5 of
Daggatt, surface, dozer, W
Prod: 40 tons
40-TON GRAV MELL, 2 mi W of
Barstowe

PAYNE, ANDREW W
489 Arietta St., San Jose
BEACH SANDS, Pescadero &
Ban Mates

PENDLETON, W B
Bes. Ili, Foresthill
AMERICAN HILL MINE, Leet
Chance dist, Flacer Co., Au., Ag

PERKINS, I STANLEY Rt 4, Box 4610, Paradice NEW ERA MINE, Butte Co, placer, An

PERLITE INDUSTRIES, INC
Tecopa
Pres & Gon Mgr: Charles II
Harrington
VP: Kenneth B Hysong
Treas & Mgr: William E Hysong
VP & Mine Supt: W R McGowen
Sec & Mill Supt: Ralph C Harrington
GREY EAGLE MINES 87, 2 & 3,
Tecopa, surface, perlite
Aset Mine Supt & Purch Agt: B B
Bedeynak
Aset Mill Supt: Charles Waugh
Mill Foreman: Jahr Whaat
Mech Eagr: Walton R Manuel
LOG-TON FURNACE

PETERSON & UTTER Bishop MARBLE MINE, Dayo Co. W

PETTY, W J & ASSOCIATES Inyokern PRAVIN GROUP, Inyo Ce, W

PHILLIPS, H J
1381 Chase Avs, El Cajon
PHILLIPS MINE, 3 mi SE of El Cajon,
underground, Au, Cu, Pb
AMAL-GRAV MILL
Under deveul

PHILLIPS, W C North San June BUCKHORN PLACER MINE, Au, Ag Under devel SPIKE BUCK PLACER, Debbies dist, Au, Ag 1810

PIERCE BROS 505 2nd 5t, Morro Bay HARD FACE GROUP, 1 1/2 mi SW of Cerro Alle Leotest, San Luis Obispo Co, surface, Cr 25-TON MILL, 6 mi from Merre Bay PINCHBACK, W H, J R 2234 Los Nietos R4, Whittier CUSTOM MILL, W

PINMACLES TUNGSTEN CO 5658 Wilshire Blvd, Lee Angeles ROUND VALLEY MINE, Inyo Co, 10 mi NW of Bishop, underground, W GRAY MELL

PIONEER MNG CO 320 Fell St, San Francisco Pres: G J Stempel CAMBRIDGE PLACER, 2 1/2 ml E of N Fork, American Riv

PIONEER PTROPHYLLITE
PRODUCTS
Box 686, Chula Vista
Pres & Ges Mign: Farraw Matthews
Seef Devothy Benney
Elec Engr: Jian Vine
Mach Engr: Robert Wilson
MATTHEW Miller, near Del Mar,
nurface, fire clay, pyrophyllike
Milas Foreman: Elluriw Millams
300-TON MILL, dry air flotation

PIPER, EMMA Box 152, Graveland MACK LODE, East Belt dist, Au, Ag

PITTSBUNGH PLATE GLASS CO Barviets Mgr: George D Dub MilNE at Barviets, Laye Co, chemicals Asst Supt: Clark Dudke Chief Chem: O M Kanwies Mast Mech: G E Supter

PLACERVILLE GOLD MNG CO Box 101, Placerville Pres: Reginald Owen VP: Lillian Belland Sec-Treas: LF & Helland PLACERVILLE GOLD MINES, underground, surface, placer, tale, Au

POWHATAN MNG CO 6721 Windsor Mill Rd, Baltimere, Md Pres: Gen Mgr: P A Mett VP & Sec: Ch Stiver Gen Supt: D E Smith SHASTA CO MINE, sabestos

PRESLEY, IRVIN
Rti, Box 5-A, LeGrand
HANNER SAND & GRAVEL, Le
Grand dist, gravel plant, Au, Ag

PRICE CREEK MINERALS CO Big Bar Pres: ER Holmes Gen Mgr: H L Moore Metall & Gen Supt: A S Hamiter ROADS END GP, I mi S of Big Bar, surface, Cu, Mo, Ag, Co, Pi, Ti Mine Supt: A S Hamiter Foreman: G C Ritchie

PROVIDENCE TUCLUMNE
GOLD MINES, LTD
310 Peets, San Francisco
Pres & Gen Mgr: A Vamini
Sec: R Fresborn
PROVIDENCE MINE, 11 1/2 mt 9E
of Sonora, underground, Au
Idle
BLIFF MINE, Hambelt Cc, Cb
Under devel
180-TON MILL, Tuolumne

PRUDENTIAL MINES GPS San Bernardine Co Come Engr: Charles Milton, 1849 F St, San Diego (See Arts)

QUARTZ HILL MNG CO, INC
Scott Bar
Press L J Camin
VP: C Garibott
Gen Mgr: R B McGinnia
Sec: J L Soligman, Jr
QUARTZ HILL MINE, 41 mi W of
Yreke, surface
Idls
800-TON GRAV MELL
Supt: R M Smith
Lds

QUINONEZ, J 235 2nd St, Hollister EL REY MINE, San Benito Co, Hg

RAMEY, GEORGE Callente MT VIEW MDIE, Kern Co., W RALSTON, R E
Box 103, Johannesburg
PIONERS MDIE, San Bermardino Co,
underground, As

RED HILL MILL Bishop REDUCTION, W

Pres: PG Com, 417 Regions
Pres: PG Com, 417 Regions
Healdsburg, 100 mt NE of
Healdsburg, underground, quickentve;
Under devel
Mine Supt: PG Com
Under devel

REUSS, B. F Box 73, Smith River PAYDAY MINE, Del Norte Co, 13 1/3 mi SE of O'Brise, Ove, surface, Gr

REUSS, R P & SIMONSON, LELOH Box 73, Smith River RAINBOW MOME, Smith Mover, surface, Cr Under devel

RINCOHADA QUICKSILVER MINE Star Ri, Box 87A, Seria Margarita Owner: G P Bell RINCOWADA MINE, 19 and E of Santa Margarita, 16g

RIVER ROCK SMC Mgr: B M Dolas GRAVEL PIT, Messed Co

RYBERG, P B Coultwille CAL-PENN-TEX GP, Mother Lode dist, Maripose Co, Au, Ag

S H & S MINING CO NIS SW Blath St, Grant Pass, Ore Cr

S & M MINERALS CO Big Plan FRACTION MINE, Lago Co, 8

SAGELAND MNG & MLG CO 5225 Wilshire Blod, Los Angeles

SAIN, L J & ASSOC Box 342, Bandsburg BLUEBIRD MINE, Kern Co. W

SALMON RIVER MINES CO Calishan Pros & Gen Mgr: EC Latchem Purch Agt: V W Peterson TRAIL CREEK MINE, As 80-TON FLOT MILL. Under Avent

SAN GABRIEL VALLEY PLACERS 1337 8 Greenwood Ave, Montebello Owner: Robert A Rigge MINE, 2 mi W of Asusa, placer, Au, Ag GRAV MILL

MARATOGA SPRINGS TALC CO Box 45, Baker Tale, San Bernardine Co

SCHEELITE MINING CO Box 32, Big Pine

SCHROEDER MINES Box 189, Mariposa MDHE, 12 mi H of Mariposa, underground, Au 20-TON MILL

SCRULTZ, PRANCIS W
Box 428, Greenville
COMEBACK MINE, 9 ml W of
Greenville, placer, Au
Under devel

SCHWORRER, LOWELL P Box 22, Vallectio RED HILL LODE, Mother Lode day, Au, Ag

SCIOCHETTI, LOUIS Box 637, Hollister JUNIPER MENE, San Benito Co., Hg

SCOTT, J H CO Merchante Exch Bidg, San Prantisco WASHINGTON MINE, Presch Galch, Au 75-TON PLOT MILL Idle SCOTT & LINDSAY

Box 154, India

WINFIELD #2 LODE, Eagle Mt
dist, Riverside Co, Cu, Pb, Ag, Au

SCOTT, SAMES I 745 Locust St, Redding MINES, Lake, Makiyou & Napa Co, Cr Idls

SECURITY MINING CO c/o W C Ennis, Mgr. No San Juan BOSS LODE, French Corral dist, Cu. An, Ag Under dawn

SHADOW MT MINES
c/o Paul McHenry, Nipton
MINE, San Bernardino Co, Ag, Pb

SHAMROCK MINING CO 720 Forum Bidg, Secremente 14 LAST CHANCE LODE, Washington (No Bloomfield) diet, Au, Ag

SHANNON & PIERSON Big Pine CLEVELAND MINE, Inyo Co, underground, Ag, Au Idle

SHARP, B B Bear Valley LUCKY BOY MINE, Maripota Co, underground, As

SHAWNEE MINES
1421 Saiem St, Chico
Owner: Robert P Bonnie,
Louisviller, Kenbuchy
Gen Mgr: Fred A Willie
MINES, operating, leasing, quarts
& placer gold, chrome properties

SHERMAN PEAK MING CO Box 583, Kernville SHERMAN PEAK & HILLTOP MINES, Tulare Co, underground, ourface, W 60-TON ORAV MILL

SHOOTING STAR TUNGSTEN CQ 1458 Alber St, No Hollywood MiNE, San Bernardino Co, W

SIERRA TALC & CLAY CO 500 Randolph St, Les Angeles 23 MINES, Keeler, Tecope & Iayo Co SHOSHONE MINES, e/o D B Kemper, Shoshone, underground, talo Frod: 30 100m TALC MINE, San Bernardino Co MINE, Saline Valley & Ubehobe diet 150-TON TALC MILL, Los Angeles

SIEVERS, P.F.
Box 34, Clements
MOKELUMNE PIT, San Joaquin Co,
placer, Au

SILICATES CORP 230 Park Ave, New York, N Y MINE, Inye Co, clay

SIEKOH CORP

423 Casatte Bidg, Reno, Nev
Proe & Gon Mgr: M B Chescher, Sr
VF: E J Schrader
Matalli H L Hazen
Soci J E Chescher
Gen Supt & Purch Agit H B Chescher, Jr
MISKON MINE, Box 148, Happy Camp,
40 mi SW of Happy Camp, curface, Au,
Ag
Prod. 109 tome
Mine Supt: H B Chescher, Jr
Foreman: A L Stewart
ENG-TOR CYAN MILL.
Mill Sept: T E Thompson
Assay: S D Howell

SKARTVEDT, S K 8898 Madieon St, La Mesa INDIAN CAMP MINE, Inyo Co, Babaston

SLAPP, J C & JOHNSON, W T Rt S, Box 80, Vicalia SHEEP CREEK MUNE, Tulare Co, W

SMITH, E B
Raymond
DAULTON LODE, Daulton diet,
Cu, Au, Ag, Pb

SMITH, ROBERT H Box 110, Johnsville POUR BIT MINE, Plumas Co, placer, Au SMITH GEN TRUCKING & MINE DEVEL Box 37, Fort Bragg TRIPPLE J (No. 1-6), 14 mi E of Furnace Cr Ranch, Doath Valley, underground, WO₃, Pb, Ag, Cu

SHELLING GOLD DREDGING Smelling DREDGE, Merced Co, Au, Ag

SNYDER, VERNE Raymond LEW REGAN PROP, Madera Co, Au

SONOMA QUICKSILVER MIMES
593 Market St, San Francisco
Free: B D Tudor
See & Treas: ER Menary
MT JACKSON-GREAT EASTERS
MINE, 4 mi No of Guerneville,
underground, Hg
180-TUNE GOULD FURNACE
Sup: H F Larson
Frod: 125 kms

SONORA MARBLE AGGREGATES CO 356 Church St, San Francisco QUARRIES, Tuolumne Co, limeetone

SOUTHERN CALIFORNIA
MINERALS CO
380 Sc Mission Rd, Los Angeles
Owner: W K Skeoch
Gen Mgr: Charles F Joy
Purch Agit Dan Tash
DEATH VALLEY AREA TALC
MINER, Shochone, talc
Mine Rupt: Ben Gomes
73-TOH ARR PLOT MILL, Loc Angeles
Mill Supt: Glen Hodges

SOUTHERN CROSS MINE Box 178, Celumbia Gen Mgr: Charles M Bryan Owners: Grant, Bryan & Poster MINE, 14 mi NW of Columbia, underground, Au 14ie

8 PANISH MINE 100 Palm Ave, San Rafael Owner: Louis R Moretti MINE, Nevada Co, surface, baryte Under devel

SPAULDING, L B
Bose 15, Ramona
METAL MT MINE, 20 mi NW of
Jacumba, underground, WO₃
Frod: 3 tone
2-TON GRAV MILL (Pilot Plant)

SPECIMEN MINE a/o Joe Costo, Bear Valley MINE, Mariposa Co, Au, Ag Under devel

STANDARD ROCK CO 1413 E Washington, Stockton Mgr: W J Nemie GRAVEL PIT & GOLD PLACER, Nerois Ranch, Cakdals dist

STEINHOFF, BUGH
Box 763, Nevada City
RAINBOW BAR GROUP, 6 mi N of
Graniteville, underground & placer, Au
Under devel

STEVENSON & HORRELL e/o L C Strvenson, Independence H & S PLACER, Kearsarge (Waucoba) dist, Au, Ag

STEWART, B A Sawyers Bar HAYWIRE PLACER, Salmon Riv dist, Au, Ag

STRAWBERRY TUNGSTEN
MINES, INC
1739 Torrace Ave, Presso 3
Pres: A J Jeesen
VP: D W Haggerty
Con Mgr & Sec: F L Johnson
Gen Supt: M C Richardson
Furch Agt: W F Dieser
STRAWBERRY MINE, 35 mM of
Bass Lake, underground, W
Prod: 50 tons
Mine Supt: M C Richardson
100-TON GRAY-FLOT MILL

STREUBEL, G R Rtl, Box 236, Groville TOLERATION PLACER, 22 mi N of Oroville, Buite Co, Au Under deval SULPHUR MNG & SUPPLY CO 1991 East Glenoaks Blvd, Glendale MINE, Inyo Co, S

SUN VALLEY TUNGSTEN CO 11370 Pendleton St, Sun Valley CUSTOM MILL, Loe Angeles Co, W

SUNSET CHROME MINE Forest Hill Opr: C L Matthers MINE, Placer Co, Cr

SUNSET MINING CO 230 5 "E" St. Lakeview, Oregon YELLOW JACKET LODE, High Grade diet, Modec Co, Au, Ag

SUNSET TUNGSTEN MINES 136 S Main St, Bishop

SUMSHINE GOLD MING CO Box 555, Residing Pres: E C Brain Sec-Treas: W D McDuffle SUNSHINE MINE, 9 ms NW of Redding, underground, Au, Ag fills 150-TON FLOT MILL.

SURCEASE MINING CO
214 30th St. Sacramento
Pres: J W Hoefling
VF a Gen Mgr: K Malone
Asst Mgr & Furch Agt: D A Moyer
Sec: J B Gee
Geol: Dionna Gardner
ATOLIA MINES, 3 mt SE of
Randsburg, undergrousid, surface &
placer, WO3
Mine Supt: P D Hoefling
100-TON FLOT GRAY MILL
Supt: R C Lipold
Assay: Robort Harrie

SUTHER LAND, L 43 29th St, San Francisco STARBOUT PLACER, Salmon Riv dist, Au, Ag

SWEENEY TUNGSTEN CO., LTD Box 185, Indio s Gen Mgr: EG Sweeney Aest Mgr: Elmer Tubbs Gen Bupt: Dale Ervin Geol: L Cornejo PINTO BASIN LODE, Chutkawnila dist, Au, Ag, w RAINBOW MINE, 50 mi E of Indio, surface, ccheelite, FeWO4, Au, Ag Tinder devel

SWEETSER, E M
Box 445, Rosamond
MINE, 4 mi NW of Rosamond,
underground, feldspar, silica
Prods 10 tens
10-TON CRUSH PLANT

TEDOC MINING CO Pistins MINES, 7 mi SW of Platins, surface, Cr

BEKAY MINES, INC
BOX 245, Tracy
Pros: S R Knapp
Pros: S R Knapp
Pros: S R Knapp
Res Mgr: A V Taylor, Jr
Res Mgr & Furch Agt: J A Briggs
Metall & Goel: H C Ingle, Jr
Sec: A V Taylor, Jr
LADD MINE, IS mis SW of Tracy,
underground, surface, MmO₂
Pros: 100 tons
Mine Supt: H C Ingle, Jr
Poreman: Rupert Mock
MAGNETIC SEP-GRAY MILL,
Jofferson Rd, Tracy,
Prod: 100 ions
Mill Foreman: Loslie Mechling
Assay: H R Kaiser

THOMAS, WALTER Box 100, Big Pine TIP TOP MINE, Inyo Co, W

THUNDER MOUNTAIN
MIC CO
Grizana
Pres à Mech Engr: DF McGrew
Gen Mgr: Archie Campbell
Metall: Edmond Phillips
Elec Engr: Alex Silmmon
Sec: C V Shipley
MINE, 10 ml N ef Orleand, Bumbolt
Co, Au, Ag, Pt
Under devul
Mine Supit Archie Campbell
50-TON FLOT-GRAV PILOT FL,
Wilder Riv.

THURMAN & WRIGHT
625 Market St, San Francisco S
Partiners: Charles H Thurman &
Allen J Wright
STATHAM, McLAIN, CLARK &
LEININGER, SKILLEN &
MENESPY PROPERTIES,
Butte Cr dist, As, Ag

TIGHTHER MINES CO
Rm 419, 56 Sutter St, San Francisco
Press: Robert E McCulloch
VP: Edwin L Otiver, W T Jenkins
Sec: Carlo S Morbio
Trens: J Malcom Visbal
RED STAR GROUP, 1/2 mi N of
Alleghany, underground, Au, Ag
Mine Supt: Charles J Ayres
mi-TON GRAV MILL
(Lensed to Yellow Jacket Consol
Gold Mines, Ltd)

TOTLAND BROS
Box 341, Leevining
Gen Mgr: G H Totland
BARBARA & BIG NUGGETT MINES,
12 mi NE of Leevining, Au, Ag, Pb

TOTLAND, GEORGE & SCANAVINO, TRAIL.
Box 341, Leevining.
Gen Mgr: George Totland
GOLD STAR MINE, Leevining, 6 mi
W of Conway Summit, underground
Under devei
GOLDEN FROG MINE, 8 mi W of
Conway Summit, underground
Under devei

TREBOR CORP 410 22nd St, Merced STAR EXCELSIOR LODE, Copperopolis dist

TROSTER, AUGUST P Box 837, Trons CORONA MINE, 35 mi NE of Trons, Jail Canyon, underground ENTE 40-TON BALL MILL

TOYE, I R Mt Buillan EARLY LODE, East Belt dist, Mariposa Co, Au, Ag

TULARE CO TUNGSTEN MINES Box 361, Lindsay BIG JIM MINE, W

TUNGSTAR-HANGING
VALLEY MNG CO
Rm 705, 6253 Hollywood
Bidg, Hollywood 28
Ch of Bd: Gayle Green
Pres: G F Temple
VP: Gen Ralph Cousins
Sec: C A Green
Treas: R E Ahlport
Gen Mgr: Ira Thomason
TUNGSTAR-HANGING VALLEY &
BLACK ROCK MINES, Box 805,
Bishop, 22 ml W of Bishop,
underground, W
GRAV-FLOT MILL, Pine Creek
Prod: 75 tons

TURTLE MOUNTAIN MNG CO FO Box \$47, Earp Partners: A O Birch, Robert R Landrum, R G Van Horn Gen Mgr: R G Van Horn Elec Eagr: E E Clark, Jr VIRGINIA MAY MINE, 10 mt W of Vidal Junctien, underground, Cu, Ag, As Mine Supt: Jesse C Meore Engr: L A Cornejo

TWINING LABORATORIES 2527 Freeno St. Freeno Owner: Freed Twining FLOT, MAGNETIC SEPARATION, prod-scale assaying Met: Vernon Young

TYSON MINING CO Box 19, Smith River TYSON MINE, Del Norte Co, Cr

UBEHEBE LEAD MINES, INC
396 So Spring St, Los Angeles 13
Pres: Grant Sayder
VP: E. & Alexander
Sec: Allen Hankin
Gen Supt: Lock Hinds
UBEHEBE MINE, Death Valley,
50 ntl Nic of Keeler, underground,
Pb. Zn. Ag. Au
Under devet

UNDERSTOCK, E N Box 50, Magalia WYOMING MINE, Butte Cr dist, lode, Au Idle

UNION MINING CO
c/o Robert C Buch,
851 W Main St, Barstow
WATERLOO (ZENDA) & UNION
LODE, Calico dist, Ag, Au
Undar deval

UNITED STATES BORAX CO 510 W 6th St, Los Angeles 14 BORAX MINE, Shoshone

UNITED MERCURY PRODUCERS ASSOC 18 Allso Way, Menlo Park Assoc Mgr: Pat Argali OLD ALMADEN PROP, Santa Clara Co, underground deposits, Hg Prospecting

UNITED STATES GYPSUM CO 300 W Adams 31, Chicago 6, Illi OPEN PIT MINE, Midland, gypsum Mgr: C L Conway OPEN PIT MINE, Plaster City, gypsum Mgr: H E Hammer Gse Colo, Mont, Mich, Nev, New Mex, Okla, Tex, Utah, South, Central &

U S LIME PRODUCTS CORP
178 S Alvarado 38, Los Angeles 57
Press: W O Anderson
Exec VP & Gen Mgr: Kennedy
Ellsworth
Res Mgr, Nevads: L N Grindell
Res Mgr, Tvolumne Co, Calif:
W A Stinson
Supt, Sloan, Nev: W E Ellie
Supt, Apex, Nev: W O Brows
Supt, Henderson, Nev: W B Mainor
Supt, Henderson, Nev: W B Mainor
Supt, Nelson, Aris: Roy Lauer
Purch Agi: E Benton Long
SONORA PLANT, Tuolumne Co,
underground
(See Aris, Nev & New Mex)

U S PUMICE SUPPLY CO, INC
638 Hollywood Bivd, Los Angeles 28Pres: Sheldon P Fay
VP: L B Clark
Sec: Leon Steinhauer
LEE VINING MINE, Lee Vining,
surface, pumice stone
CLASS MTN MINE, Tulelake, surface,
pumice stone
Mine Supt: D H Campbell, Thomas Tull

U S TUNGSTEN CORP

Under devel

U S VANADIUM CO
A DIV OF UNION CARBIDE &
CARBON BORP
Bishop
VP: A P Cortalyou
Gen Mgr: B L McKinley
Gen Supt: A C Sada
Purch Agt: C A Smith
PINE CREEK MINE, 27 md NW of
Bishop, underground, WO3, MoO3

Purch Agt: C A Smith
PINE CREEK MINE, 27 mi
Bishop, underground, WO₃,
Frod 809 Ness
Mine Supt: T W Holmes
Mine Eagt: J F Emereon
1,000-TON PLOT MILL
MIII Supt: L E Sausa
(See Colo, East)

USHER, J W Sawyere Bar SECURITY MINE, Sieklyou Co, underground, Au

UTAH CONSTR CO (MINE OPERATORS & CONTR) 1 Montgomery St, San Francisco

VALLEY VIEW MINES CO
513 Atlas Bidg, Sait Lake City, Utah
Pres: Louis W Cramer
See-Treas: A M Buranck
Gen Supt: Page Blakemore, Jr
CHEMUNG, SARITA MINES, 6 ml
NE of Bridgeport, underground,
surface, An, Ag
90-TON CYANIDE MILL.

VICTORVILLE LIME ROCK CO Box 548, Victorville Pres: L K Ayers Gea Mgr: E A Piercy VICTOR QUARRY, 3 mi E of Victorville, surface, limestone Frod: 400 tens Mine Supt: R W Cowsert MILL. Fareman: Haruid Heshilke

VICTORY MINERALS, INC Victorville Press: CR Seals VP: Thomas Knight Sec-Treas: Wm Johnstone Engr: Douglas Christensen BLUE NUGGET MINE, 23 mm N of Victorville, underground, Cu GREY EAGLE GROUP, Pb, Ag Humstone

VOLO MINING CO
464 Main St, Placerville
Pres: F V Phillips
SHAW MINE, El Dorado Co, Au, Ag

W M C MINING CO
PO Box 350, Grass Valley
Pros: Laurence J Mader
VP: Margaret Webb
Gen Mgr: Kenneth Crowder
SUNSET MINE, 7 mt. NE of Grass
Valley, underground, Au, Ag
Mine Supt: L hader
Asst Mgr: K Crowder
Under devel
48-TON FLOT MILL
RETORT EMELTER.

WAGER, C E c/o Nimshew State, Chico KELLY HILL PLACER, Butte Creek, Au, Ag

WALABU MINING CO 3015 Rosedale Hwy, Bekersfield Pres: Walter F Buase Geol: C N Shuette CUDDEBACK MINE, near Keene, underground, Hg Under devel

WALKENG MINING CO Box 128, Taylorsville Pres: Ray B Wiser VP & Gen Mgr: Alden H Hughes Sec: Essun Alle MINE, 25 mi N ef Taylorsville, underground, Au, Cu, Ag Under devel

WALKER CORP 163 East Ely, Nev Pros: R T Walker VP: W J Walker Sec: B T Walker SHASTA KING MINE, 15 mi NW of Redding, Cu, Za Idle (See Silver Star-Queene Mine, Isc.

WALMER, CARL Forest Hill MOHAWK PLACER, Michigan Bluff dist, Ag, Au

WALTERS, J R
Box 107, Mornbrook
LITTLE EVA PLACER, 1 1/2 mi W
of Hornbrook, underground, Au
Prod: 1 ton
Under devel
3-TON ROD MILL

*WARNER, C D & SON, LTD 1027 Yosemite Blvd, Modesto GRAVEL PIT, Waterford dist

WARNKEN, LOUIS JR
BOX 37, Lone Pine
DURHAM, ST CHARLES, FERNANDO
& ALAMEDA GROUP, Inyo Co, W

WATTS; JOHN L (ESTATE)
ili9 Knoll Dr, Monterey Park
BLACK MOUNTAIN MINE, San
Bernardino Co, W

WAXNER, MRS WILLIAM E 323 So.Church St, Grass Valley GOLD STAR PLACER, You Bet dist, Au, Ag

WAYNE, WILLIAM 8
Box 2, Pawnskin
GLACIER MINE, San Bernardino Co, Au

WEBB, DAVID L O'Brien, Oregon WEBB MINE, Del Norte Co, Hg WEBB, TED
O'Bries, Oregon
DIPPER MINE, Del Norte Co, Cr

WEGMAN, MARGARET
PO Box 195, Randsburg
WEGMAN GROUP LODE, Mojave
dist, Kern Co, Ag, Au, Pb

WEST AMERICAN TUNGSTEN
CO
Oviati Bidg, Los Angeles
PLACER WASHING PLANT, Atolia,
W, Au
Prod: 50 yds
COLE & SWIFT PLACERS,

WEST COAST CHROME PRODUCERS Box 324 Coalings Owners: Jack James & Chaven Thicketun Oper: JR Holmon MINE, 38 mi NW of Coalings

WESTERN BARIUM CORP Ruse Bldg, San Francisco MINE, Mariposa Co, barite

WESTERN DEVEL CO 218 N Canon Dr, Beverly Hille Partners: R S Hall & Maurice Willoe, Jr Gen Mgr: R Piatt MINE, 18 1/2 mi NW of Blythe, surface

WESTERN GOLD, INC
-Rm 937, 68 Post St, San Francisco 4
Pres: W H Taylor
Gen Mgr: T H Taylor
RELLEF HILL MINE, Nevada Co,
hydraulic, Au
Isla

WESTERN REFRACTORIES
CO
Box 189, lone
Pres: A C Gladding
VP: A L Gladding
Gen Mgr: & Sec: O M Tupper, Sr
Gen Supt: N W Ersley
Clay

WESTERN PHOSPHATES, INC 636 California St, San Francisco Pres: Hans Stauffer (See Utah)

WESTERN TALC CO
1901 E Slauson Ave, Los Angeles
Pres & Gen Mgr: F H Savell
VP: Malcolm Stewart
Sec: J Y Elwood
WESTERN TALC MINE, 14 mi SE
of Tecopa, underground, tale
Mine Supt: Marcue Beger
MILL
Supt, Los Angeles: FC Frey
Supt, Dunn: A T Krebs

WHISKEY HILL MINE Whiskey Town MINE, Shasta Co, underground, Au

WHITE & RAY
Box 54, Orleans
PEARCH MINE, Humboldt Co,
placer
idis

WHITE MT TALC CO Box 446, Lone Pine Gne Mgr: Wm Bonham WHITE MT, FLORENCE, ALBERTA TRRNITY MINES, 4 ml n of Cerre Gordoa, underground, talc

WILLOW VALLEY MINES,
INC
461 Market St, San Francisco
Pres & Gen Mgr: J M Hoff
VP: JJ Navone
Asst Mgr: L O McCoy
Sec: G V Pettigrew
Purch Ags: L Manson
MINE, 2 mm from Nevada City,
underground, Au
Prod: 103 une
Mine Supt: L O McCoy
Forvman: E A Doppelmayr
125-TON PLOT MILL, Deer Cr
Mill Sup: E O Berger

WIND WHEEL MINE
Box 151, Columbia
Owner: R O Greeves
MINE, underground, Au, Ag
Under devel
ORAV MILL

WISDOM, J S 14631 Sherman Way, Van Nuys BUSTER GROUP LODE, White Mountain dist, Ag, 1th, Zn Lilis

WOLDEN, ESTEN Box 1103, Nevada City HARDWORK PLACER, Sierra Co, Au

WOLFS, W C
Rt I, Bon 17:0, Colfan
OAK HILL PLACER, You Bet dist
Under devel

WOODRUFF, WILLIAM W
Rt 2, Box 85-A, Perris
CENTENNIAL MINE, Rivereide Co,
underground, Au, Ag
Life
Life
(Parris) dist, Au, Ag
(Parris) dist, Au, Ag

WYLIE, A K
Alturas
LOST CABIN LODE, Winters dist,
Au, Ag

YEAROUT, D J Box 465, ivenai HEISKELL PROPERTY, Fresno Riv (Dennie) diet, placer, Au, Ag

YELLOW JACKET COMS
OOLD MINES
120 Chester Ave, Bakersfield
Pres: Citiford Dichwt
VP: A F Bullard
Sec: James Ebert
Gen Supti C J Ayres
Geol: B C Austin
MINES, Alleghany, underground,
Au, Ag
Prod: 25 tons

YOUNG, CHARLES B Seind Valley -ANITA PLACER, Klameth Riv dist, Au, Ag

YOUNG & RUNKLE
3438 ist Ave. Secramento
MARGARET D PLACER, West
Best (Letrobe) dist, Au, Ag

YUBA COMS GOLD FIELDS
381 California St, San Francisco
Pres: M C Bolster
VP: F C Van Deinne
Gen Mgr: E J German
Sec-Treas: O W Smith
Geol: Leelie Gassaway
PLACER MRIPES, 10 mi NE of
Maryaville, 7 dredges on Yuba Riv
Res Seys: Ceeli Brophy
Gen Field Mgr: C V Deaver

YUKOHL TUNGSTEN MNG CO Box 39, Dunlap Pres & Gen Mgr: R W Berge TRAWEEK MINE, W Mgr: S H Strickland 30-TON MILL Mile

ZINDELL, WALTER 8 Box 71, Essex HOWE MINE, San Bernardine Co, W

COLORADO

ACME MMG CC 156 Montgomery St, San Francisco, Calli Mgr: Ryners Calligner CARDONATE QUEEN MINS, Tailer Ca, An

ADOLPH POSTON MRG CO-Box 510, Cases City COTOPAES MINE, Presson Co, Zn, Pb, Cu, Ag

AJAN BASE METALS, INC
8 Howard-Cambeld Bldg.
Sanis Barbara, Callé
Pros: L E Dreeback
Gam Mgr & Kagr Gamertic Cellius
See: Don Dakstil
MORO AJAN & EMPRE GROUPS,
Lake City, 16 mb W of Lake City,
underground, Fb, Ze.
Under devel

AJAH MNG & Oll CO Box 1975, Grand Function Pres: R F Climore Sec-Treas: JR Cagle AJAX & LUCKY DAY CAVE MINESS, 6 ml 3W of Geloway, underground, U, V (Leased in Climon Uraniam Cel

ALEXANDER LEASE Box 13, Ouray Opr: Earl A Alexander LOST DAY-PATSY MINE, Ouray Co., Zn, Pb, Ag

ALLIED CHRM & DYS CORP,
GEN CHEM DIV
BOX 228, BOXIGHT
Mgr, Mng Oper: Robert H Dickson
Acet Mgr, Mng Oper: Wilkert J Treep
JAMESTOWN MAINES, 20 mi NW of
Boxider, under greund, CaFg
Front: 105 Ions
Supt: A W Heckmon.
Mine Foreman: William Popet
Mine Engr: James B Pennington
100-TON MILL
MILI Foreman: A W McCown
Mill Foreman: T J Hussham
Mill Foreman: T J Hussham
Gen New Max, No., South & East)

AMCO MNG CO 317 Main, Grand Ametion Partners: Frank L Seymour & Georgia Wright LITTLE JOHNNIE MINE, 8 mt 8 of Gateway, underground, U

A MERICAS SWELTINO &
REFINING CO
607 First Mat'l Banh Bidg,
Derner 3
Mgr: J Faul Harrison
ARKANSAS VALLEY PLANT,
BOX 973, Leadville, FP
Supi: T P Falsey
Asset Supi: ED Leaghtridge
Metallurgistas MD Rood, L.C.
Travio, R Emeshe, F A De Santie,
G Cohenour
Master Mech: C Hopfinger
Chief Clerk: Edward J Kelly
Safety Engr: Frank Stevens
Plant Engr: Prank Stevens
Plant Engr: P L Arrabevater
Ch Assayer: R J Elfows
Ch Chem: Max Koseus
Ch Dist PLANT, Derves, Cd
Supi: W L Miles, Jr
Asset Supi: Max Costs
Metal: C P Basher, Jr
Safety Swep: J J Ryan
LEADVILLE MNG DEFT
Minc Supi: A Haceler
Res Geol: G L Fairchild
Asst Mine Supi: R S Burbon
Minc Engr: Howard Bloomfield
Mine Furwinsen: Andy O'Korn
Mine Engr: Jack Kendrick
DENS, Zo, Fo, As, Ag
(See Aria, Calif, Ida, Mond, Here Men,
Utah, Wooh, Tux, Central & Easth

ANDERSON BROS Goldon MALACHITE MINE, Jufferson Co, Co ANDRESS, CLYDE & ASSOC Placevilla PAYROCK MINE, Mesa Co, U, V

AURORA URANIUM CO 317 Main St, Grand Junction LITTLE JONNIE MINE, Mess Co. U, V

BACHELOR CORP
Box 40, Placerville
Pross Roberts Ludwig
VF: Jonn Herturello
Sec: H E Popham
BLANKE & LITTLE MINDSY MINES,
25 ml N of Placerville, underground
U, Th. rare earths
Under dewel
Mine Suyt: R Riddle
46-TON FLOT MILL, chem ext
Mill Supt: Roy Bossinap

BAND CREEK MINE Empire Owner: A V Maybam Lessee: Cisfford Wattworth MINE, near Empire, Au, Ag. Pb, 2n Under devei

BEAR CR MNG CO (Subside of Mannerott Copper Corp) 1219 California St, Denver & Dist Geel: William Bergin (See Calif, Minn, Wash, South & East)

B D & P MNG CO c/o C A Bets, Rt 2, Glenwood fiprings UNDINE MINE, Gunnisson Co, Ag. Po

BERYLLIUM MNG CO, INC Box 274. Gunntsum Pres: JR Wernlinger VP: A L Schuler Gen Mgr: C A Wernlinger Sec: JE Sheets OHIO CTTY MINE, 22 md from Gunnison, surface, beryl, mica, feldapar, tantalite, columbite Purkman: Koscu Rishis

BONITA MING & DEV CO-Box 186, Eliverton Pres: F C Brightly, Jr Gen Mgr. B F Enclinger See: V G Rion LEAD CARBONATE MENE, II mi NE of Silverton, underground, Au, Zo., Fb., Ag. Cu PRIDE OF BONITA MINE, II mi N of Silverton, underground, Fb., Ag. Za EN MA-CREDCON-GALENA GROUP, San Juan Co., Zn., Fb., Ag Under devel 50-TON FLOT MILL, Gladstone Supt: N F Enringer

B R C MINIMG CO Idaho Springs Pres: W J Roberto ALLEN RMORY MINE, Messezome, underground, Pb, Zo, Ag

BUCKSKIN JOE MYNES, LTD Alma Gen Mgr: C W Jordan PHILLIPS MINE, Au, Ag, Cu, Ph, Za, Pe Proct. 200 tons monthly Foreman, Joe Thibusinas

BUCKEYE MNG CO Westcliff BUCKEYE MINE, Custer Co, Au, Ag. Pb, Za

CALLAHAE ZIEC-LEAD CO Sargents Supt: JE Dunn AKRON MUNC, Whitepine, Pb, Za 188-TON FLOT MILL Idle (Set Alasha & Eart)

CAMP BIRD LTD Oursy MIRE, Correy, Au, Ag, Cu, Pb, Zs Mine Supt: Keith P Johnson (Leased to King Lease, Inc - see East)

CANYON GOLD, 198C 108 E Benosti Ass. Cripole Creek Pros: Troy E Wade YP: William A Kyner Sec-Tream: Jeses Simmons RUBIE & GRACE GREEWWCOD MINE, 2 mi Brom Cripole Cr. As CHAMPION MINES CO
941 Monroe St., Denver 8
Pres: Jess Stimmon
Sec. J J Bitmone
MORNING STAR 6 LAST CHANCE
MINES
LEASES ON JERRY JOHNSON,
WPH & PURENT QUEEN MINES,
Cripple Creek, underground, Au
1816

CLIMAX MOLYBDENUM CO
Climax

Gen Mgr: P Coolbough

Mgr, Explor Div: C J Abrams

Gen Supt: Reibert Henderson

Elec Engr: A L Bernert

Metall: A J Herzig

Safety Engr: Leo Glanville

Purch Agt: J L Russell

CLIMAX MSNE, Climen, 190 ml W

of Denver, underground & surface,

MoSg, WO3, Sn

Prod: 28, 000 tems

Mine Eugrt: Jehn Petty

Act Mine Supt: E J Elsenach

Mine Ergr: Cecil Smith

Mine Forman: Jeffer Jelmona,

Edward Mainen

Act Mill Supt: Frank Windelph

Mill Foreman: Inell O Burh

Ch Chemist: E B Anderson

(Ese Easi)

CLIMAX URANIUM CO
Box 867, Grand Junction
Pros: C L Wilson
VF & Gen Mgr: Barvin L Kay
Asst Cen Mgr: E Dugan
Mistal: Woodrow Knott
Sec: L A Cowan
Geol: R F Surve, J D Shaw,
K D Kassch
Purch Agt: Ray Gough
MINES in Colo, Utah & Aris, 50-310
mid 5-8v of Grand Junction, underground, U, V.
Under devel
Mine Supit: J E Westee
Act Mine Supit: Asthony M Mastrovich,
R C Fruess
CHEM Mills, Grand Junction
Mill Supit: R C Toerper
Act Mill Supit: R C Toerper
Act Mill Supit: Paul Wise
Ger East

(See East)

COBB & WELDON

40! Pine St. Boulder

MINES, Boulder tangeten dist,
surface, W

Prod: 70 tons

Mine Supt: Harrison S Cobb

76-TON GRAY MILL, Lakewood

mar Nederland

Mill Supt: A B Weldon

COLD SPRING TUNGSTEN CO
405 Interstate Trust Bldg, Denver
COLD SPRING MINE, Boulder Co., WOS

COLURADO FUEL &
IRON CORP
Continental Oil Bidg, Denver
Pres: A Frans
VP, Chg Opr: J J Martin
Bec: D C McGraw
Purch Agt: L C Hosse
MINING DEPT, Box 316, Possitio
Gen Mgr, Mines: G H Rupp
Asst Mgr, Mines: Rebert R
Williams, Jr
Gook: D A Caster
Ch Elses: R E Davis
BIONARCE QUARRY, Garfield,
eurface, timestone
Prod: 3,000 tons
Mine Supt: J E Whitney
CANON DOLLIMITE QUARRY,
Canno City, serface, colorable
Prod: 400 tons
Mine Supt: E C Jagow
(Ser Wyomburg)

COLORADO GOLD RING, 1MC
BOX 186, Silverton
GOLD SING & GOLDEN MONARCH
MINES, underground, Au, Ag, Cu, Fb, Za
Supt: L M Meriss
Asst Supt: C W Florming
Engr: John Heiggs
Floreman, John Jenkins
60-TON FLOT MILL
Supt: Geo Volliaque
Asst Supt: H P Ehrlinger III.
His

COLD SPRING TUNGSTEN, INC Rederland Pros: Boris Pregel VP: Alexander Pregel Gen Mgr: G C Ridland Sec: Wm Resemblatt Mine Supt: Maurice Castagne MINE, 48 and EW of Donver, underground, WOg

COLORADO BRABIUM MINES,

INC 334 Main Rt. Grand Junction Pres: Armide L. Klimmen Sect. J. O. Kinyshior Geo. Bupt. C. Barney Geol: K. Huston LOST MINE, See Mignel Co., Gypsom Valley, So mi SW of Puells, underground, U, W Frid: 20 tum

COLUMBINE PLACER
MINES, LNC
Rn 300, 1050 bish St, Danser 2
Prex: Sammel Informace
Sen: Dwight F Johnson
RED BUCK MINE, 35 mi ME of
Ountison, underground, Au, Ag, Cu
Under deves

COMS URANIUM MINES, INC 207 Darling Bidg, Sait Lake City, Uhah Oen Supt: Weeley Mondion BULL, CANYON, 30 ms from Habrita, U, W Under devel CARPENTER FLATS CLAIMS, Montreas Ca. amplimention (See Utah)

CORDILLERA CORP
902 Senhoard Bidg, Seattle I, Wash
Pree & Gen Mgr: Robert P Day
VP: Harry N Eckman
Sec: B A Merlino
Gen Supt: Marry Duin,
LING MINE, Bux 81, Pairplay, 4 mi
N of Alma, Au, Ag, Cu, Zu
Under devel
FLOT MILL, Sowth Platte Guich

COSTELLO LEASE
Bonana BA, Villa Greve
Opr: W J Costello
BAWLEY MINE, Bonanza, 20 mi NW
of Villa Grove, underground, Pb, Ag.
Cu, Za
Prod: 50 imms

CRESSON CONS GOLD MMG & MLG CO, THE
Box 127, Cripple Creek
Pres: ME Shoup
VP & Gen Mgr. Max & Howen
Sec. H Thites
Gen Supt. & M Bebee, Jr
Mech Engr. Ouy Rorabaugh
Purch Agi: H L Stone
MINE, 3 mi E of Cripple Creek,
underground, Au
Prod. 100 tens
Mine Buyt: A H Bebee, Jr

CRESTED BUTTE NNG & MLG 133 Lincoln St, Denver VP & Gen Mgr: Massey J Raskia DAISY, CRESTED BUTTE, OH BE JOYFUL & LITTLE DAILY MINUES, GURNISON CU

CRIPPLE CREEK MBG &
MLG CO
Box 247, Cripple Creek
Pres: Lisle Hagier
Gen Mgr: Richard B Wallu
GOLD KING MINE, I mi freen
Cripple Cr, underground, Au

DANIEL, GEORGE & 625 F St. Salida STONEWALL MINE, Chafte Co Idle

DAVENPORT, W L.
Brenksuridge
WELLINGTON MINE, 2 1/2 and E
of Brechenridge, underground,
Pp. Zn. Ag. Au
Prod: 26 tame
Mine Supt; Hareld Horn
Mine Engr: Marvin Burger

DEADWOOD LEASING CO Cripple Creek MINE, As

DEPENDER MNG CO
Hilberghill
Mgr: Roy O Pratt
DEPENDER MINE, Coates Co,
Pb, Ag
Hoder deval

MINING WORLD

DIAMOND MT MINES, INC liabo Springs Mgr: Wm Wright KITTY CLYDE MINE, Clear Cr Co

DULANEY MNG CO

BIZ First Nat'l Bank Bidg
Grand Junction
Pres & Gen Mgr: R-O Delaney
VP & Asst Gen Mgr: R-O Delaney
VP & Harry B Friedman
Sec: Thomas E Potts
Gen Sapt: Leroy Hemphili
Geol: George Gilmore, Jr
Purch Agt Mrs lags Poste
RADIUM GP OPER, 31 mi 8 of
Dove Creek, undergrossed, U, V
Prod: 100 tons
Mine Supt: Leroy Hemphili
Mine Foremani Alva Zunick
Mine Engr: George Gilmore, Jr

E & H LEASING CO Mecker BURRELL M & LAST DAY MINES, Montrose Co. U

EAST, JIM & EING, K J Idaho Springs CRAZY GIRL MINE, Clear Creek Co, An, Ag, Pb

BAST RIDGE GO
BOX 589, Oursy
Pres: Cariton E Sysme
Gen Sapat: A E Diretum
Geol: P H Predestrick
AMDRUS MINE, 14 mi SW of Silverton,
underground, Za, Pb, Cts, Ag, Au
KOKELER MINE, 80 and M of Silverton,
under ground
Under deveil
Size Calif

EMPERIUS MNG GO
Emperius Bidg, Creede
Pres: TB PORROM
Treas: HB Hayden
Gom Mgr: E W Nelsem
COMMODORE, AMSTNYDY,
EQUINOX, ROBENSON &
HAPPY TROUGHT MUNES, 1 1/3 ed
H of Creede, Pe, Za, Ag, An, Cu
Mins Buyt: TB Possess
120-TON FLOT MILE, 1 and 3 of
Creede
MIII Supt: W D Colone
Assayer: Cordon Hossestino

STA MINES
BY Main, Grund Junction
Partners: Frank L Seymour, Vernon.
Pick, & Jim Martin
RAE MARIE MINE, 50 mt W of
Gateway, underground
Mine Supit: James P Martin

EUREKA TUNGSTEH c/o Guy Piles, 3205 9th St, Boulder EUREKA MINE, Boulder Co, WO3

FINCHER, OT18 924 Pine St, Grand Jametion RONNIE #1 MINE, Mosa Co. U. V

FLORADO MNG CO Montesums Oper: Etvin Octrick MINES, Summit Co., Ag. Cu., Pb

FOLSOM, JOSIE K MNG & MLG CO 4280A Holity Ave, 3t Loude 13, Mo Pres: Dr C R Curran Gen Mgr: Fred W Kentha Dir: Paul Becker Dir: Occar F Heeged COSIE K FOLSOM MEWE, 13 mt W of Del Worte, Au Assay: George G Hayes, Denver Under devel

FORGE HILL TUNNEL Rt 3, Box 367, Golden Gen Mgr: CMNord E Morrison TUNNEL, 1/2 mt 5W of Russell Gulch, underground, Fb, Za, Ag, Au Litts

FORTUNE MINE
Leadwille
Leadwood J L Adams & G L
Fairchild
MINE, Lake Co. Pb., Es., Au. Ag

POSTER, RALPH 1217 Celorado Ave, Grand Junction 3NOW SHOE, MESA #5

FOURSOME MNG CO Silverium Gen Mgr: Wm Erickson COLUMBUS MINE, Au, Ag, Cu, Fo, Zo FOUR CORRERS URANIUM
CORP
434 US Nat'l Bank Bldg,
Dunver 2
Pres a Gen Mgy: E B Sanders
VP: A A Smala
Sec: J L Bexaulin
Gen Supt: R E Williams, W R Brosson
Geol: C R Willey
MINES, Box 25, Norwood,
undorground, U, W

PRONT RANGE MINES, INC Burne Vault Bidg, Denver Pres: John Desenses VP & Gen Mgr: George H Teal MATTE MINE, Clear Cr Co, PS, Au, Ag MELVINA MINE, Boulder Co, Au STRONG & MARY CASHER MINES, Toller Co, Au KING SOLOMON GROUP Under devei CLEAR CREEK MILL, Dument, Pot

GALENA QUEEN LEASING CO c/o Glean Oarder, Silverton MINE, San Juan Co Lilis

GARFIELD MINE
Box 208; Salida
Gen Mgr: W E Buriceon
Contractor: Cart Mc Mellen
GARFIELD MINE, 30 mi w of Salida,
underground, Pb, Au, Ag '
lifle

GATEWAY MNO a DEVEL CO Route 4, Grand Jemotion Pres à Gen Mgr; Edw Gilmore VP: R C Hartman Sec: John Thorston Treas: Herman Texiswf Engr: Jake Lewis CORVUSITE MENE, 3 mi W of Gateway, underground Prod: 10 tume

GAYMON & WEBB Breckenridge FITTSBURG PLACER LODE, Summit Co, Au, Ag, Pb

GILES, LEROY & CO
Idaho Springs
DEXIE MINE, Clear Creek Co

GLOBE HILL MNG CO
335 Independence Bidg,
Colorade Springs
Pres & Gen Mgr: A S Koncelman
VP: Payson Gregory
Sec-Treas: George F Grote
PROPER & CHICAGO TUBINEL MINES,
I md E of Cripple Creek, undergd, Au
Prodi: 15 kmms
Mine Supt: Harry Allen

GOLDEN CYCLE CORP
Box 98, Carlton Bidg,
Colorado Springs
Pres: Mr Elboup
VP & Gen Mgr: Max Bowen
Purch Agt: Moward Stone
AJAX MINE, Cripple Creek, Au
Supt: Charles Carlton
Foreman: M H Grice
1,000-TON FLOT-CYAN MILL
Supt: Howard Kell
MINE, Atkinson Mesa near Uravan, V
Supt: Ben Slothower
Under devel

GRAMLICH MINERALS INC Press & Gen Mgr: J W Gramlich, &r VP & Supt: J W Gramlich, &r Sec-Tress: P J Gramlich LJON CR CLAIMS, &W of Faradox, U, V Prod: 10 tons

GREAT EASTERN MNG CO Silvertion Pres: W L Chase Ch of Bd: Art Kinkletter Purch Agt: Carl Lesson GREAT EASTERN BURNS GULCH, SIOUX CITY, GREEN MT & PRIDE OF THE WEST MINES, underground, Au, Ag. Cu. Ph. Zn (Leased to Fismming, Slade & Knotiz) 100-TON FLOT MILL, Howardsville Owner: J C Grant

GREAT LAKES CARBON CORP.
Rosita
ALEXITE MINE, Rosita, surface,
pertits

100-TON MILL, Florence (See Colo, Calif, Nev, New Mex, Oregon & East)

GREGORY & PACKARD PLACER Blackhawk Owner: L D Clark MINE, Gilpin Co, Au

GREAT WESTERN Lessees: Hans Mosch & Son, 1002 Reno Dr. Arvada GREAT WESTERN MINE, Clear Creek Co. Au. Ag. Pb

HASSELBUSH, RAY & ZIESENISS, HENRY Box 491, Rifle MIDNIGHT MINE, IS on NE of Mesker, underground, U, Y Prod: 8 toos

HENNING, KETTLE & WALKER Westcliffe DEFENDER MINE, underground, Ag, Pb, Zn (Leased to E4 Staty)

HERRON BROS Box 545, Aspen Mgr: John L Herron HENRY CLAY GROUP, Aspen, Ag. Po

BETZER MINES, INC
Boulder
Press: Elmer Hetser
MINES, Boulder Co, W. beased
HOOSIER MINES, Prime & Johnson
PROSPECT TUNNEL, Jones & Funk
SPENCER TUNNEL, Ray & Plarty
LAST CHANCE MINE, Prime,
Juhnson & McKernise
HEINE LEASE, Hennings & Smith

HOLDEMAN, E T Uravan LONG PARK #6 & #13 MINES, 13 mi SE of Uravan, underground, U V Mine Supt: E T Holdeman Mine Foreman: Calvin O'Bryant

IDA BELLE MINE Brechenridge Sub-lessee: Wm K Kirschmer

EDARADO MNG CO
BOX D. Ourny
Pres: Oscar H Johnson
Gen Mgr: John B Wise
MINES, IZ mi SW of Ourny on
Red Mountain, underground, Cu, Pb, Za
Prod: 800 tras
Mine Foreman: John Kearney
Mine Engr: C C Chamberlain
800-TON FLOT MILL
Mill Supr: IR W Unger
(See Newmost Mng Corp. Dasi)

INTERNATL MIM & CHEM
CORP, CONS PELDS PAR DEPT
PLANT, Denver, foldspar
Prod: 2,000 tons monthly
Pl Supt: A Fismith
Mine Supt: A Fiscone
MINE, Parkdale, feldspar, snice,
slice
Idia
PLANT, Pueblo, mica
Pl Supt: A J Roshorii
(See Ariz, Minat, So Dak, Wye,
Central, South, East)

ISABELLA MINES, INC Colorado Springe Pres: Wm A Kymer VP: Franklia Ferguson Sec-Treas & Gon Mgr: J M Keener EABELLA MINE, Cripple Creek

JACK PINE MNG CO
507 Boston Bildg, Denver 2
Pros & Gen Mgr: D Y Wairous
VP: John B Traylor
Escu Wm D Bissel
STEVENS, MERDOTA, BLACK EAGLE,
INGOMAR & GABANTA MINES, Clear
Creek Co, Pb, Ag, An, Zn, Cu
100-TON FLOT MILL, Black Eagle
75-TON GRAV MILL, Siver Leaf
30-TON FLOT MILL, Siver Leaf

JEPPREY & U.LIBARRI Montetuma QUALL, WATERLOO, MEW YORK MINES, Summit Co Idle SILVER KING MINE, Summit Co PLYMOUTH MILL JEWELL, LOREN
RIFE
MAMOUTH MINE, Mosa Ca. U. V

JOE DANDY MNG CO
334 Independence Bidg.
Colorado Springs
Pros: Hidreth Prost
Vp: Vernon Mitchell
Gen Mgr & Tress: A 8 Konesiman
Sec: C E Yose
Supt: Harry Alba.
JOE DANDY, C O B. COMMONWEALTH, HILLSIDE, CLEMAX
VICTORY & SEATTLE MINES,
3-5 mit E of Cripple Cr, underground, surface, Au

JONES, MYRON & ASBOC Rice ST LOUIS CLAIM, Dolores Co. Au

JONES LEAD & BING MINES

Box 921, Leadville
Owner: Robert L. Jones
OARDHALD MENE, 8 set W of
Leadville, underground, Pb. En, &u, Ag
Frod: 805 Rens
SUMMITVILLE MENIS, 45 and W of
Monte Vista, underground &
surface, Cu, &s
Under devet
RESURRECTION 88, 8 and 8 of
Leadville, underground, Pb. Zn, Au, Ag
Prod: 102 underground, Ph. Zn, Au, Ag
Mine Foregrand: S A WEGER

KANARADO MHG & 9846L CO Box 27, Ohio Pres: Charles Vacious VP. B V Warross CARTER MINE, Generison Co, As, Ag FLOT-AMAL MILL

KENNEBEC MNG CO
Canon City
Lesse: M J Erettett
Gen Mgr: A E toyondum
Supt: B L Rebecom
ORPHAN BOY MINE, Punk Co
Idle

KING LEASE, 199C
OUTSY
Pres: Joseph King
Sec: Franklin & Bell
Treas: Kenneth Moore
Asst Sec: James K Groves
Purch Agt 3 E Danielson
CAMP BIRD MINE, 5 mt SW ef
Oursy, underground, Pr. Za, Cw, Ag, Au
Sugst: L. D Barry
Asst Supt: F A Bell
Fursman: F M MicConscisin
Eager: T it Heditud
CAMP BIRD MILL, flok
Prod: 130-240 tone
Supt: Our Consairt
(Leased from Camp Bird, Left)

KINGS TURQUOISE CO Manassa Pres: Charles O King Mgr & Mine Foreman: Horses & King TURQUOISE MINE, Manassa

KNICKERBOCKER MWG CO Rice Cen Mgr: K L Erickson Asst Gen Mgr: H J Knickerbocker Gen Supt: Edward C Baser UNION-CARBONATE MINE, 3 mi É of Rice, underground, Ze, Pb, Ag Edle

KRONSBEIN, ROBERT & Norwood MINE in San Miguel Co, W

LA GARITA MINES Box 61, La Garlta MINE, Saguache Co, Au 29-TON FLOT MILL

LAKE MNG CO
Idaho Springs
LAKE MINE, Closer Crook Co,
Au, Ag, Pb

LAMBERTSON, JOHN Quantizon STAR MINE GROUP, 55 ml H of Guantaon, underground, Ph., Ag Prod: 366 tone per year DOCTOR MINE, 27 ml H of Guantaon, underground, Za 1654. LASALLE MNG CO
Box 217, Grand Junction
Mgr: Matthew P Rowe
MINES, Montrose Co, U, V
Mine Foreman: Jess Allen

LEADVILLE LEAD CORP 2812 E 6th Ave, Donver Press: Dr Hothert Risk VP: Frank Wiscik Gen Mgr: James Tiffany See: Benj L Wright, Jr BILLITOP MINE, 10 mi SW of Fairpla Lidle

LECLAIR CONS MNG CO Box 127, Cripple Creek Gen Mgr: Man W Bowen MINE, Cripple Creek, Au

LENR, NENRY O Grand Junction THUNDERBOLT MINE, Montrose Co, U

LEHR, VERNON L Cateway MINE, Calamity Mesa, 17 mi E of Gateway on Uncompangre Plateau, U

LITTLE DARLING MINES c/o Sophie Knight, Minturn MINE, Gunnison Co. Ag. Pb

LOMBARD MINES, INC
blame Springs
Pres & Gen Mgr. Occar L Stutenroth
VP: M A Leern
LOMBARD MENT, II on NW of Ideles
Springs at Alice, Au and rare
minerals in black sand concentrate
Under devel
Mine Supt: Henry L Nelson
Mine Engr. E A Hollingsworth

LUFTON MNG CO, INC
Box 498, Georgatown
Pres & Geo May: Ellis F Lupton
VF & Asst Gen May: Ellis F Lupton
VF & Asst Gen May: Ellis F Lupton
See & Furch Agt: W Vernon
Metal: Axel Johnson
GRIZZLY GULCH GROUP, 2 mi \$ of
Bakerville, underground, Fb, Ze,
Au, Ag. Cu
Prod: \$0.0000
Mine Supt: Karl Elener
Acst Mine Supt: Ell Zegar
Mine Foreman: T P Davis

MACKEY MINES, INC e/o R V Mackey, Box 209, Goulder MINE, Boulder Co, Au, Ag, Cu, Pb Under devel

M & S INC Salida Pres: J W Magnuson Gen Mgr: R H Magnuson SPIKEBUCK MINE & SNOWDRIFT MINE, surface, feldspar

MARIPOSA MNG CO
Box 1730, Telluride
Press: A Dulos
Gen Mgr: George T McCall
BUTTERFLY MINE, Ophir, I mi
S of Ophir Loop, underground, Pb
Au, Cu, Zn
MS

MARKLEY MNG & EXPLOR CO Crippie Creek Mgr: Lee Brown TENDERPOOT PROPERTY, Au

MARY MURPHY GOLD MNG CO Box 2005 Satista Gen Mgr: W E Burleson MINE, 4 and SW of St Elmo, underground Euconom: Henry Carey Idle /

McCRISTY & SWERDFEGER Busider OPHIR MINE, underground, W

MICHAELIS, G J Bom 1817, Colorado Springs HOOSIER MUNE, 3 mt NE of Cripple Crook, underground, Au, Ag , Elle MIDNIGHT MNG CO
Box 188, Aspen
Pree & Com Mgr: P J Willoughby
VP: P T Willoughby
Sec: P M Willoughby
MIDNIGHT MINE, 7 ml S of Aspen,
underground, Ag, Pb, Zn
Prod: 40 tone
75-TON FLOT MILL

MILE HIGH MNG CO Sliver Plume Mgr: Lawrence Schreiner SMUGGLER MINE, Sliver Plume, Pb, Zn, Ag

MINERALS ENGR CO
SOI Fourth Ave, Grand Junction
Press: Blaze Buyewil
VF & Gen Mgr: R G Sullivan
Sec: A F Boyd
Trees: W G Haldane
Purch Agi: Phablan Welch
DIAMOND & LONGHOLE DRILLING
CONTRACTORS
(See Montans, Utah)

MÖHAWK MINES e/c Walter Enyeart Box 184, Breckenringe Opre: Enyeart & Taylor MOHAWK & RADICAL MINES, Summit Co 1818

MOLYBDENUM CORP OF AMERICA Idaho Speings URAD MINE & MILL Under devel (See Calif, New Mox & East)

MONO DIAMOND JOE MINES
Idaho Springs
Mgg: Arthur Portenier
MINE, Clear Creek Co
His

MONTE CRISTO GP
Alma
Oper: G F Galloway, Jr
MINES, Summit Co, Au, Ag, Fb, Za

NABOB DEVEL CO
SIZ Majestic Bildy, Denver
Press: C B Froman
VP: G F Crites
Gen Mgr: Chas O Parker
Sect. E M Stuart
NABOH MINE, 3 ml S of Lawson,
underground, Ag. Pb. Au, Cu
Supt: Chas O Parker

MATOMAS CO Fairplay DREDGE #1, Park Co, Au, Ag Local Supt: Webb Skinner Like (See Calif, Nevada)

MEESHAM MNG CO Nucla Gen Mgr: Glenn D Neesham FAWN SPRINGS \$12 MINE, Bull Canon, 30 mt 8 of Urevan, underground, U, V Prod. 10 tons

NEDERLAND MINES, INC
Office of Sec. 991 Ave of the
Americas, New York, M Y
Pres: Carl Rosen
Gen Mgr: Mathew Ollsen
Sec. G A Norvath
CARIBOU MINE, 1408 Pearl St,
Boulder, 5 ml W of Nedezland,
underground, 1g, 79, Au
Under devel
100-TON FLOT MILL, 6 ml E of
Numbriani

MEVADA MIMES CO
ROW DOR, HOMMES
Pros. Walter Timmey
Gen Mgr: JG O'Beien
CORA MINE, Au, Ag, Cu, Fb, Za
SMELFTER
Foreman: Curtis Quinn
Assay: E E Smith
Edia
(Leased to Lester Cahill)

NEW DOMINION MNG CO Ophir Mgr: Randolph Beliefe NEW DOMINION MINE, Ophir, Au, Ag, Pb URAY MILL Idle NEW JERSEY ZINC CO, EMPIRE ZINC DIV

Gen Supt, Empire Zinc Div:

F J Malnit
Supt, Gilman Oper: W L Jude
Plant Chief: Harold Stienmier
Engr 6 Geo! R E Radabaugh
Fyraumnei: Frank Sherwood
Accountant: R E Sundberg
EAGLE MiNE, underground, Pe, 2n
Mine Chief: R L Sayre
600-TON FLOT MILL
Mill Chief: J G Craig
(See New Mex, South & East)

MEW MONARCH LEASE Box 939, Leadville NEW MONARCH GROUP, Stampton underground, Au, Ag, Cu, Fb, Za 25-TON GRAV PILOT MALL Hile

OLD HUNDRED GOLD MNG CO
Box 448, Silverton
Pres: C N Kimball
VP: P W Neuenachwande?
Gen Bugst: W G Sandell
GARRY-OWEN MINE, 6 mi NE of
Silverton, underground, Pb, Zn,
Cc, Ag, Au
Under devel
Prod: 100 tens
Mine Foreman: Albert White
185-TON FLOT MILL, Cunningham
Guich
Lilia

OLIVERS BROS Norwood AMERICAN EAGLE MINE, San Miguel Co, U, V

ORTMAYER MNG CO
1037 Oursy Ave, Grand Junction
MINES, San Miguel Co, U, V
EMPTRE GROUP, McIntyre dist
Pres: C G Ortmayer
Gen Mgr & Sec: W E Haldane
MINE, 22 ml N of Dove Creek,
underground, U, V
Mine Supt: O E Jonson
LEGIN LEASE, Blickrock

OUTLET MNG CO
Box 75, Creede
Purch Agi. LW T Jackson
PHOENE LODE, 3 mi N of Creede,
Pb. Ag, As
Under Savel
Prod: 10 tons
Mine Supt: Gavin W Skinner
Assi Supt: Raiph C Walker

OZARK-MAHONING CO,
MNG DIV
Tules. Okia MINE, 4 1/2 mi N of
Cowdrey, underground & eurface,
CaF2
Mine Supt: B E Neber
Mine Engr: F H Hansen
FLOT MILL.
Mill Supt: W W Fowler
Asst Mill Supt: A O Paris
Asstyr: J A Cornell
JAMESTOWN MINE, Jamestown,
underground, CaF2
Mine Supt: H B Williameon
FLOT MILL
Mill Supt: W D Wagner
(See New Mex, Okls, East)

P M LEASERS
Box 176, Empire
Mgr: C B Myers
GOLD FESSURE GROUP, Clear Cr Co

PARK CITY CONS MINES CO Gunnison Gen Mgy: Holan Probat KEYSTONE MINE, Created Butte, 29 atl N of Quantoon, underground, Zn, Fb, Cu, Ag Under dewat (Operated by Amer Smelt & Refin Co) Sies Vitab)

PASSIFLORA MING CO
113 N 6th St, Canon City
Pres: Charles A Billey
VP & Gen Supt: M N Taylor
Mistallz Merie N Bhaw
Sec. Jos D Blunt
PASSIFLORA MINES, 1-1 1/2 mi N of
Westcliffe, underground, Ag, Pb, Cu, Au
17-5ar favel

PAYMASTER MINES
Breckearidge
Opr: Mike Vineon
MINE, Summit Co. Montesuma diet

PRIDE OF THE WEST, INC
BOX 422, Stiventon
Agent: C Lesite Larcon
PRIDE OF THE WEST MINE,
San Juan Co, Za, Pb, Ag, Ac

PRIME, GEO & JOHNSON BROS Nederland HOOSIER MINE, Boulder Co, WO₃

PLATEAU URANIUM MNG CORP 18-18 Reed Bidg. Grand Junction Pres & Gen Mgr: S Y Guthrie VP: W H Killbourse See: Jos Gola, Jr Geol: Richard J Pursley MDNE, San Rafael Swell, Geteway mng dist, U, V Under Sevel

RADIATION MINES, INC Fairplay Pres & Gen Mgr: Leo D Wells VP: Herman Bergstrand Sec: W M Hoff CLIMAX GP, 80 mi SW of Grand Junction, underground; U, V Under deves

RAIMBOW PLACER, INC 2044 Depew 81, Denver 2 Pree: Dan C Harrington VP: B L Secton Sec: Martha V Kewm PLACER, Tin Cup, 35 mi NE of Gundson, Au, Ag, Cu Idle

BARE EARTHS MNG CO Box 1011, Grand Junction Pres: Robert Ludwig Gen Supt: Koscoe Riddle EXPLORATION, Custer, Freemont, Gunnison Countles, Th, rare earth sisments Under devel

REALTY CO, THE 937 US Nat'l Bank Bldg, Denver 2 Pres & Gen Mgr: Chandler Weaver VP: Ray A Bennett Sec: T M Dines CALHOUN GROUP, WOOD, BEZANT MINES, Box 186, Central City, 1172 mt, Sw Of Central City, Under ground, Au, Ag, Cu, Pb, U Under devel Mine Foreman: Henry Ress Size Usual)

RESURRECTION MINING CO
Box 936, Leadville
Ch of Bd. Fred Searle, Jr
Prev: Plato Malosemoff
Gen Mgr: B B Greenlee
Aset Mgr: A M Mackay
Metall: J B Saunders
Elec Engr: J T Kendricke
Sec: W P Schmid
Geol: G W H Norman
Purch Agt: F R Bochatey
100-TON FLOT MILL, Leadville
Mill Suph: A M Mackey
Mill Forenan: Adolph Kuss, Sr.
(See Newmont Ming Corp., Eact)

REVENUE MINES
Ouray
Mar: M Campbell Dann
REVENUE MINE, 6 1/2 ml SW
of Ouray, Zn, Pb, Ag, Au, underground,
exploration work

REYNOLDS MNG CORP-Poncha Springs MINE, undgd & surf, fluorspar (See Ariz, Central, South)

RHINE, A R 2550 Yarrow St, Denver GENERAL TELLER MINE Montexuma, Pb, Zn

RICO-ARGENTINE MNG CO Rico Pres & Gen Mgr: S B Hinckley VP: JC Johnson Sec-Treas: L J Lerwill Purch Agi: F J Koenig Gen Supt: J J Seerley ARGENTINE & MT SPRINGS MINES, near Rico, underground, Fb, Zn, Ag, CU, Au Prod: 140 Tons Mine Supt: Hugh W, Olmstead 140-TON FLOT MILL, Rico Supt: C W Dahlberg Assay: C H Tuller

MINING WORLD

ROBERTS & CO Leadville DOLLY B LEASE, Lake Co Prod: 150 tone monthly

ROBUSH, JOHN & CO Cripple Creek Opre: John & Earl Robusn EL PASO MINE, Teller Co.

ROGERS, J & E CROOK Nederland TENNESSEE MINE, S of Nederland, underground, W

ST LOUIS LEASE PARTNERSHIP c/o Joseph Kerson, Leadville ST LOUIS MINE, Lake Co

SALLY BARBER MNG CO SALLY BARBER MNG CO (Formerly Teller Basin Mng & Mig Co) Gen Mgr: Mike Vinson Asst Mgr: Pat Vinson CHAUTAUQUA MINE, 5 1/2 mi SW of Montesuma, underground, Pb, Ag, Cu Prod: 28 10008 Mine Supt: Fred Harris Mine Engr: Bill Kelay 60 TON FLOT MILL, Montesuma Mill Supk: Mike Vinson Assay: W H Smith

SCHWARTZWADLER, FRED 207 Boyd Bldg, Golden RALSTON CREEK MINE, Jefferson

SHATTUCK-DENN MNG CO Uravan
MINE, Club Mesa, W of Uravan, U
Under devel
Supt: Tom Newell
(See Ariz, New Mex, East)

SHENANDOAH - DIVES Res Mgr: Edwin A Larson MINE, 5 mi E of Silverton underground, Pb, Zn, Cu, Au, Mine Supt: John Holmgren Under devel 750-TON GRAV-FLOT MILL, 2 mi from Silverton (See Central)

SILVER BAY MINES, INC BLACK HAWK, OCCIDENTAL & BULLION KING MINES, San Juan Co.

SILVER BELL MINES CO SILVER BELL MINES CO 434 US NA'! Bank Bldg, Denvei Pres & Gen Mgr: E H Sanders VP: E J Nord Sec: R C Strassman Gen Supt: A A Smith Cons Engr: C R Willey SILVER BELL MINE, Ophir, Ag, SILVER BELL MINE, Ophir, Ag Cu, Pb, W, Zn CARBONERO MINE, 8 mi from Telluride, Ag, Pb, Zn, Cu, W 150 TON FLOT MILL, Ophir Mill Supt: J Lucas Assay: Wm Paris

SILVER SHIELD MINING & MILLING CO 704 Newhouse Bldg, Salt Lake City 1. Utah l, Utah
Pres: Mary Kyto Ellaworth
VP & Gen Mgr: L E Stein
Sec: Samuel Bernstein
Gen Supt: Phil W Page
MINE, Box 544 Ouray
250-TON CUSTOM FLOT MILL

J R SIMPLOT CO Continental Bank Bidg. Boise, Idaho
COLO URANIUM OPER, exploration, (
Mgr. explore: Louis Gaggini
Mgr. Colo oper: P T Peterson
Proj Super: B T Zitting
(See Idaho, Nev)

SKALLA, A P Gen Mgr: A F Skalia MONOGRAM MINES, 30 mi S of Uravan, underground, U, V Foreman: J R Skalia Foreman: JR Skalia PAWN SPRINGS MINE 89 & 12, underground, U, V Uoder devei ANNA MAY & DOG TAIL MINES, Mostrone Co. U. SLAGTER EXPLORATION CO 9 Main St, Evansville, Ind MINE, Box 343, Dive Creek, 15 mi SW Mine Supt & Purch Agt: Wm Barbre

SKIDMORE MNG CO SKID MORE MNG CO
Box 311 Dove Creek & Rt 11,
Grand Junction
LEGIN GP, Dove Creek
Supt: MG McGrath
Purch Agt: Wm J Plank
Mine Foreman: Ernest B Blair
POUR-OFF GP, Dove Creek
Supt: Chees Allmond
LAKALUCRE MINES, Box 237, Cortes Warren Lyen

SMITH & RUGG RAMBLER MINE, Boulder Co, WO3

SPRAY, EDWIN C 1537 Washington St, Denver 3 SWEET HOME MINE, Alma, 4 mi up Buckekin Gulch, undgd, Ag, Cu, Pb, Za

STAMINA MNG & MLG CO Hillstone Mgr: W B Porch, Jr VP: T Lee Witcher Sec: Harriett E. Porch Gen Supt: Edwin A Porch Geol: Linus Litzey, P Toulmin MiNE, T mi Sw of Hillside, under ground, Au, Ag, Cu Mine Supt: Edwin A Porch Aset Supt: Edwin A Porch Aset Supt: Edwin A Porch Aset Supt: Ed Stacy 100 TON FLOT MILL

STRATTON CRIPPLE CREEK MNG & DEVEL CO Box 178, Colorado Springs Pres: D P Strickler VP: C W Chamberlain Sec-Trens: H L Stubbe MINES, Box 148, Cripple Creek, on Bull & Globe Hills Mine Supt: J H Keener

STURM MINING CO Rt 12, Box 2535, Grand Junction Pres & Gen Mgr: Fred Sturm VP & Purch Agt: Leona Sturm Sec-Treas: Don R Sturm Mech Engr: Wesley Sturm
Safety Engr: Lewis Sturm
ELIZABETH GROUP, Mesa Creek,
64 mi SW of Grand Junction,
surface, U. V

TELLURIDE MINES, INC
SMUGGLER UNION & TOMBOY GOLD
MINES, San Miguel Co, Au, Ag, Pb, Zn
Supt: TE McCandisss
Engr: C E Melbye
550-TON GRAV-FLOT MILL
Aset Supt: Carl M Inga
(See Idarado Mng Co)

TEAL & ASSOCIATES
Box 37, Boulder
Pres: G H Teal
RED SIGN MINE, Boulder, W
Supt: S M West
25-TON GRAY MILL
Supt: W E Swanson

THREE STATES URANIUM CORP 354 Main St, Grand Junci Pres: Kenneth H Huston VP: C H Moslander, Jr Sec-Treas: Homer Dale

REASURE MOUNTAIN GOLD MNG CO 202 Midland Savings Bldg, Denver 2 203 Midiand Savings Bldg, Denver 2
Pres: Guy L V Emereon
Sec: A W Flecher
SANDIAGO, SAN JUAN, QUEEN,
GOLDEN PLEECE & SCOTIA MINES,
II mi NW of Silverton, undergd, Au,
Ag, Fb, Zo, Mn
Under Dewel
Mine Supi: Merle D Lloyd

TYONE MINING CO Box 486, Idaho Springs
Partners: Buerin, Smith & Penicle
TYONE MINE, Cripple Creek
Supt: W D Finicle Assay: George Treder Under devel

VENTURE LEASING COMPANY Stiverton
GOLD PRINCE MINE, 17 mi N of Silverton, underground, Pb, Zn, Cu, Au, Ag 50-TON FLOT MILL, Portal

UKELE, JOHN BLACK MAMMY MINE, Mesa Co, U

UNITED EMPIRE GOLD MINES & UNITED MINES CO 13 Citisens Nat'l Bank Bldg, Boulde AMERICAN MINE, Au, Ag, Cu, Pb, Zn

UNITED GOLD MINES CO
BOX 137, Cripple Creek
Pres: Me Shoup
VP & Gen Mgr: Max W Bowen
Gen Supt: C H Carlton
VINDICATOR & PORTLAND MINES, Victor, underground, Au, Ag

U S GYPSUM CO GYPSUM MINE, Loveland, oper quarry, gypeum Wks Mgr: JR Miner (See Calf, Mich, Mont, New Mex, Nev, Okis, Tex, Utah, Wash, South, Central, & East)

U S METALS CORP 210 Mercantile Bidg, Denver Purch Agt: Alfred O Brehmer HENRIETTA MINE, 7 1/2 mi N of Silverson, undergd, Pb, Ag, Zn, Cu, Au Under devel Mine Engr: Walter W Bentley

Mine Engr: Walter W Bentley

U S VANADIUM CO, A DIV

OF UNION CARBIDE & CARBON

CORP

Grand Junction

Gen Mgr: H L McKinley

Mgr, Mines: J W Hill

Gen Supt: A Q Lundquist

Supt of Plants: J F Brenton

Mine Supt: E M Paris

Purch Agt: L E McCarty

MINES In Montrose, Mosa & San

Miguel Counties, underground, U, V

Asst Mine Supt: E E Blamey

Mine Engr: A Carver

MILLS, Uravan & Rifle

Supt, Rifle: H C Peterson

Aset Supt: K W Lenty

Supt, Uravan: R D VanZante

(See Calif, Nev, Utah, East)

URANIUM EXPLORERS
SYNDICATE
424 Lafayette St, Denver
Gen Mgr: J Bromfield
URANINITE, CORVUSITE claims
in Mesa, and San Miguel counties
Under devel

UTZE LODE CO Box 500, Solida Treas: Harold R Koster MADONNA MINE, Au, Ag, Cu, Pb, Zn

VANADIUM CORP OF AMER Box 761, Durango
VP & Gen Mgr: D W Viles
Purch Agt: John Blackburn
MinES, cattered over 200square-mile area, underground square-mile area, underground
& surface, U, V
Dir, Plateau Open: Rege Edwards
Mine Supt: R L Anderson
Explor Super: E B Daggett
Ming Engre: W F Edwards,
Harry Jessing
BOAST LEACH, Ph., Durango
Mill Suot; John A Maxwell
Aset Supt: R G Vesper
Gen Master Mech: Troy Newland
ROAST LEACH PL, Naturita
Gen Supt: W L Anderson

Gen Supt: W L Anderson Mill Supt: L E Daniels (See Ariz, New Mex, Utah & East)

VILLA GROVE TURQUOISE MINE
Villa Grove
LODE, Saguache Co, Turquoise

WALKER, ART R Silverton QUEEN ANN MINE, San Juan Co

WEEMS - WEAVER MNG CO Box 209, Salida ANTORO MINE, Box 387, Salida, undergd, Au, Ag, Pb, Zn, Cu (Leased to W E & S E Burleson) Idle

WELLS, LEO O Rt I, Box 1680, Escondido, MANERVA MINE, Summit Co, WESTERN GOLD MINES, INC Crown King, Aris
Press: Silas P Silverman
MINE, Rito Seco property, Costilla
Co, Au
Under devei

WESTERN NON-METALLICS 330 "D".St. Pueblq GRINDING PL, mica Prod: 400 tons per month

WILLIAMSON & SON 738 U S Nat'l Bank Bldg, Denver Gen Mgr: H M Williamson WANO GOLD MINE & FLUORSPAR PROPERTIES, fluorspar 100-TON GRAV-FLOT MILL

WORCESTER MINES Urayan Mgr: John Hill MINE, Near Urayan, development drifting, U

WILLMARTH MINES Georgetown
WILLMARTH SILVER & LEAD MINES
3 mi 8 of Bakerville, Pb, Ag, Au, Zn
Lilie

WRIGHT BROTHERS PROD CLAIM, Uravan area, U (leased to U S Vapadium)

WRIGHT, WARREN Rt 4, Grand Junction MINE, 65 mi SW of Grand Junction, undergd, U, V Under devei

ZIMMERSON, BEN 1302 Main St, Grand Junction BELLMONT #1 MINE, Mesa Co, U, V

ZODOMOK MINES, INC ZODOMOK MINES, INC
Box 483; Durango
VP & Furch Agt: Albert Zufall
Sec & Gen Supt: Don Deluche
BESSIE G MINE, 18 md W of Durango,
underground, Au, Ag
Prod: 28 tons
30 TON GRAV MILL
Mill Supt: Karle S Goff

IDAHO

AMERICAN SILVER MNG CO 123 W 4th Ave, Spokane, Wash Pres: Ew Conrad VP: J M Henneck Sec: LB Conrad Geol: Robert E Sorenson MINE, Osburn, i mi S of Osburn, underground, Ag, Cu, Au Under devel by Polaris Mng Co

AMERICAN SMELTING &
REFINING CO, NW MNG DEPT
Box 440, Wallace
Mgr: JE Berg
Asst Mgr: JC Kteffer
Supt of Mines: W-T Geombe
Supt of Mille: G S Price
Mech, Elec Supt: W A Boyer
Purch Agt: FL White
JACK WAITE MINE, Duthle, underground, Ph. Zn. Ag
Supt: C H Blackwell
300-TON FLOT MILL
Supt: Hervey LeGault Supt: Harvey LoGauit (Operated under agreement with Jack Waite Mining Co) GALENA UNIT, 3 mi W of Wallace, GALENA UNIT, 3 mt W of Walls underground, Pb, Ag
Mine Supt: Norman Vienes
Under devel
PAGE MINE, Pb, Za, Ag
Mine Supt: T M Tower
Assi Supt: C J Ward
MORNING MINE, Pb, Za, Ag
Mine Supt: H H Shook
Prod: 200 tons
MILL accessorate for MILL, concentrator
Mill Supt: G S Price
Prod: 1,300 tons
FRISCO MINE, Pb, Ze, Ag
Mine Supt: G B Christian
Frod: 120 tens
(See Yulcan & Calletan Eine-Leas) (See Ariz, Calif, Colo, Mo, Mont, New Mex, Utah, Wash, Tex & East)

AHCHOR GROUP
Keilingg
Ope: Frank McKinkey
MDKS, Sursent diet, Manhoos Co,
Ag, Cu, Fo, Ee

A PACNE MINES CO

123 5 Maple St. Jerome
Pres: TC Stater, de
VP: L St Lindsey
Sou: H P Jayne
Trous: Guy S Simone
Con Mgr & Pur Agt. Pruch Stamphrey
Met: Delinar Joven
Sinc & Moch Engr: O L Sichen
APACHE MINES, Sen 387, Scaley,
4 mi W of Haliey, underground & surface,
Ag, Pc, Zn, Au
Under deval
Prod: III Unos
Mine & Mill Suph: Prush Stamphrey
Acat Mine & Mill Suph: Prush Stamphrey
Acat Mine & Mill Suph: P C Landburg
Stine Foreman: Examen Yadan

AUXER GOLD WIFE, THE Stud Point
Free: Leized C Johnson
VP & Gen Mgr: Journe Campbell
Sec: A R Nelson
AUXER MINE, Y and FFS of Bope,
underground, San, Ag
Under Street
BOSTON GROUP, Bonner Co,
Pend COvalle San, Am, Ag
Idle

BALTIMORE-CAMAS
MINES, INC.
601 Eastman Bidg. Beloe
Pros & Gon Mgr: Goo W Dann
Acatil R V Temperes
Gen Supi: Walter P Simmore
Mng Engr: Donald E Anderson
100-TON FLOT MILL, Ely,
Nevada, WOg

BANNER-IDAMO MINES, INC Scott Bidg, Wallane Pros: John Davis VP: C W Bentley Sec-Treas: J W Commertih

BAUMHOFF-MARSHALL CO Big Creek, Caseade Valley Press Fred Baushell Dr Maxier: Jack Fischer 6-CUBC POOT DREDDE, Big Cr, Cascade Valley, measits, Pred 9, 900 cc pdo of memositsbearing and par day MADMETIC SEP Pt., Bokes, mossnite, Zr, II, garnet Supt. Albert M Whitten Accomski Gram Rysum

BAYHORSE MINS, INC Challe Pres: O J Saliebury VP & Gen Mgr: W B Seignet 500-Trood: O O Languese FACIFC, BEARDSLEE, RAMSHORN, & FOREST ROSE GROUPS, IS and SW of Challis, underge, FA, & Zo, Cu., Au 100-TON GRAV FLOT MILL, Saphorse

BEHRENS BROS Elk City Mgr: WT Bobrons LITTLE MOOSE CR FL, EM City dist, Idaho Co, Ao, Ag

BELL, DAVID &
Mackay
ALURA, MePADDEN & YANKEE
FORK MINES, Custor Co, Ag. Pb,
Zo, Undergd

BENTON MINE Burke Opr: A E Tofte MINE, Lelande Dist, Sections Co. Ag, Fe, Za

BEVAN, MAGNUS Suro Fork Con Mgr: Magnus Bown Suc: Resal Bowns SAWLOG GROUP, 36 mi S of Solmon Chy, undergd & surface, &c. Under decel 5-TON GRAY MILL

HIG IT MINE Lesses: Etherton & Schmittroth, Sensiterville

BIG FOUR MINE
Riggine
Opre: Scent & Howard Williams
MINE, Florence & French Cr Dist,
Idaho Co, An, Ag

BLACK BEAR MINES CO Wallson Pres: W H Hancon BLACK BEAR GROUP, near Gem, 3 mi S of Wallore, Ph. En, Ag (Lessed to G W Ringwi)

Cleased to G W Ringvii

B R A D LEY SING IN G CO
Bradiey Field, Botes
Exec VP: John D Bradley
Gen Mgr. Yellow Pine- B B Mahoney
Asst Mgr. W G Wallace
Gen Mgr. Imm: C C Hathern
Met. R J McRas
YELLOW PINE MINE, Subsetts,
everface, WCG, Sh, Au, Ag,
Under dreel
Mine Boylt Edwin Adams
Equip Supt. G R Hansen
2, 408-TON FLOT CONCENTRATOR
YELLOW PINE SMELTER
Smelter Supt: Dean Wild
IMA MINE, Patterson, undergd,
WCG, Ag, Cu, Ph
Mine Supt: Glark C Colline
Mech Supt: J A Miller
Mine Engr: J L Fletcher
Ch Clerk: F F Puse
ITS-TON GRAV-FLOT MILL
Factories
Mill Supt: Gl M McCall
ISec Cally

BROUGH, FRED J Salmon POPE-SHENOW MENE, Lemba Co, Cu Under davel

BUNKER CHANCE MRG CO Box 800, Kellogg Pres: T. Hume VP: Trd Schindler Gen Mgr: Robert M Genmer's MNR, 7 mil 5 of Kellogg, undergd, Ag, Pb, Cu Under devel

BUNKER HILL & SULLIYAN
MNG & CONG CO
Bou 29, Kollogg
Pres: S & Enston
VP & Gen Mgr: J B Haffner
Metall: Harvid Lee
Elee Engr: Le Verra Griffin
Gool: Roger McConnet
Mcch Engr: A C Strevenson
Safety Engr: J T Williams
Assi Boe: I A Robsem
Purch Agi E P Bioth
MHRE, Kellogg, undergs, Ag, Pe,
Zn
Supi: S McDougall
Assi Supi: R S Hooper
Foreman Pent Sisan
Engr: Austin Purk
Prod: 1, Bolt tons
3, 000-TON FLOT MILL
Supi: C Y Garbor
Assi Supi: A F Korol
Foreman R F Reisan
Assay: I H Lankey
SMELTER & 600-TON PUNING PL,
Kellogg
Supi: P C Pedderson
Assi Supi: C Corgs Dum

CALERA MINING CO.

BLACKBIRD DIV (SUBSID OF

NOWE SOUND COD

COUNT

Pres: Hi Sharp

Mgr: E B Douglas

Eloc Engr: W Lea

Geol: R E Cribbe

Bleck Engr: J Plentin

Purch Agt: W C Jonnen

BLACKBIRD MANE, 42 md W of

Salmon, underground, subalt, Cu

Mine Supit: R L Sederberg

Mine Foreman: W O'Neal

Mine Engr: C J Whitey

1, 000-TON FLOT MILL

Mill Supit: C O Hower

Hill Foreman: F Venchime

Asseyer: D E Cutting

(See Calera, Utah, Howe Sound,

Wash & East)

CAPITOL SILVER LEAD MNG CG Genrom Bidg, Wallace Pres: II C Mowery VP: Jon Evan Sec-Treas: II M Huemann MINE, Ag. Ph Under Greek

CHALLIS VIEW MINE
Challis
Owners: Henry & Eth G Smith
Lussews: Hethacks Bros et al,
Midwale, Utah
MINE, 8 mi W of Challie, Dougherty
Oulch, Ag, Pb
1518

CHAMPION MINE
Box 281, Mackay
Pros: J. L. Ausich
MANE, 8 onl 8 of Mackay,
underground, Pb, Za
ISIs
Mine Supt: D E Boll

CHECKMATE MINE
Boise
Opr: Earl Moceman
MNE, West View dist, Gem Co,
Au, Ag, Pb, Zn

CIRC TWINS MING CORP Orogrands Pres & Geo Sign: Rose & Bratisla, 1800 SE 23nd Way, Mercer Island, Wash VP. CHUIS H Bratiain Sec-Treas: Marc Bratiain KNOB BILL. MINE dormorty Polatic Mine), curface, Au, Cu, WOg Under devel PENMAN PROP, underground, Au Albe

CLARE, EDWARD B Box 151, Clark Fork LUCKY OPAL & SURPRISE GROUPS, 3 ms NE of Clark Fork, Pb, Za, Under devel GREEN MONARCH LEASE, Pb, Ag, Zo

CLAYTON SILVER MINES

Mox 830, Wallace
Pres & Gen Mgr. W. M. Yesman
VP: A Breghterstone
Soc: Ray Morrison
MINES, Clayton, undergd, As, Ag,
Cu, Pe, Ze
Mine Supt: Newman Smith
100-TON FLOT MILL
Mill Soyt: Allred Nelson

COEUR D'ALENE MIPES
CORP.
303 Gyde-Taylor Bidg, Wallace
Pres: Il C Mowery
VP: P E Jacobs
Sec: WA Callaway
MNERAL PORNT MIRE, Osbern,
1 mi S of Osbern, Ag, Cu, Sh,
umder davel
Oper: Pelaris Ming Cs
600-TON FLOT MILL.

COEUR D'ALENE MHG CO e/o Eugene F McCamm, Bon ti07, Walliace Pres: T M Reynolds PLACER, 18 mu N of Wallace, Au Litie

COEUR D'ALENE SILVER OIANT, INC Bos 638, Kollegg Pres à Gen Mgr. Harry G Alway YP: R E Newman Soc-Treas: Wayne A Braisard MINE, E Pork of Big Gr, Keellegg, Ag. 78, idde Engri-John B Pilate 82 LODE CLAIMS, Shoukone Ce, under working contract

COME BACK MNG CO
Idaho City
Pres: C C Polirebild
WP: Chae F Adams
Gen Mgr 6 Sec: L F Treger
MNE, 20 mi N of Shaho City, Au,
Ag, Fo, Zn, Cu
Under sevul

CONTINENTAL MING CO Box 489, Wallace VP: JE McKay Sec-Treas: H F Magnisson Gen Mgr: C E Small COPPER BASIN MINE
Mackay
Oper: Clinton A Ounderson
MINE, Alder Ce dist, Custor Co,
Au, Ag, Cu

COPPER QUEEN MINE Salman Oper: E G Peron MINE, Mackinaw diet, Lemhi Co, Au, Ag, Co

CROOKED REV PLACERS clo Clearwater Dresiging Co. Spokane, Wash PLACERS, Elk City diet, Idaho Co. Au, Ag

CUBA MINING CO Wallars Pres: W H Hanson MINES, 2 mi from Wallace, Ag. Pb Under devel

CUSTER COPPER CORP
4312 Franklin Rd, Boise
Pros & Gen Migr: W P Barton
WF: David E Bell
Sec: MS Barton
EMPIRE MINE, MacKay, undergrd,
Cu, WOJ, Au, Ag
Under devel

DAISY KINGS CLASMS
Garden Valley
Comers: E W Bowman
CLAIMS, Deadwood Basin, Ag, Au,
PS, Cu
Under davel

DARLAND, JACK A & L A Cuprum SO PEACOCK MINE, 48 mm NW of Council, undergd, Cu, Ag, As Idle

DAVIES, JR & SONS

Beine
FRINCESS BLUE RIRBON MONE
Beaver diet, Camas Co, Ag Po

DAY MINES, INC

Boo 1810, Wallane
Pres & Gen Mgr: H L Dag
Asst Mgr: Rotlin Farmhe
Sec: S P Heidfeld
Purch Agt: G T Krison
AURUM MINES, 2 mi NW of Republic,
underground, Au, Ag, idle
DAYROCK, MONITOR, TASMARACK,
SHERMAN & HERCULES MINES,
Wallace, underground, FA, Za, Ag
Supt: C & Sparks
4 FLOT MILLS
Empt: L & Great

DEVIL'S TOE DREDGES CO Shoup Pres: A P Smuthers Sec: Dave Hawei MINE, 39 mi W of Shoup, Gragtine placer, Au, rure earth Prod: 100 yds

DOUGLAS MRG CO
Box 330, Wallace
Pres & Gen Mgr: Dtanley A Seston
YP: Robert E Surveyor
Sec: L E Hill
DOUGLAS MINE, Pine Creek, 13
mi SW of Kellogg, Pb, Ze
Under Devel
(Devel in coop with Spokane-Mahe
Mining Co)

DUVALL CO 210 Eccles Bidg, Ogden, Stah VIRGINIA GROUP, Blackpine diet, Cassia Co, An, Ag

EAST SILVER BELT LEAD MINES, INC. Box 885, Wallace Press: R E Suryman VP: C R Porcusan Sec: Elef Enloss MINE, sear Mullan Life.

GOLCONDA LEAD MINES
BOX 337, Walles
Pros & Gen Mgr. A H Festherwione
VP. J A Festherwione
Sec.: HF Magnason
Gen Supt & Parch Agt: W W
Fratherstone
Gest: Phil Conley
GOLCONDA MINE, 2 1/3 mt E
of Wallace, undergrd, Fb, Ag, En
Prod: 50 tons

355-TON FLOT MILL, Mulian R4, Wallace Mill Supt: C E Bloom Asst Mill Supt: Lee Hugsenin Mill Foreman: Richard Holmberg Assayer: Peter Mack

GOLD COIN MINE Star Rt 2, Sand Poins Mgr: J Bessemer MiNE, Bonner Co, Ag, Ph., Zu

GOLD HUNTER MANKES, INC R 1501, Ill W Washington St. Chicago 2, Illinoise Pres: JD Murphy Gen Mgr: L M Norrie MINE, E of Mullan, Ag. Fe, Zo 503-TON FLOT MILA. Under devel

GOLDSTONE MNG GO
511 Securities Bldg,
Beattle, Wash
Pres & Gen Mgr. D W Portar
VP: Lyon Gunning
Sec: Emil Mattman
Gen Supt: Waiter E Designton
Geol: Arthur Laken
Purch Agt: F L Mills
GOLDSTONE MIME, Salmen, 21 mi
SE of Salmon, undergré, Au. Cu. Fe
Mine Supt: Waiter Designton
Mine Foreman: Lasonard Wenroth
Mine Engr: Arthur Laken
Under devei
150-TON FLOT Mills,
Under const

GOLDEN RULE MINE McCail Opr: George Wikstrom MiNE, Burgdorf-Marshail Lake dist, Idaho Co, Au, Ag

GRANADA LEAD MINES INC
Box 257, Wallace
Press: EG Gnacdinger
VP: RL Roundy
Mat: Full Cenley
GRANADA MINE, 2 1/3 ms E of
Wallace, Fb, Ag, Zm
Under devei
FLOT MILL
Assays: Feter Mach

GRAND VIEW MINE
BOX K-81, Salmon
MINE, 11 mi 8 of Salmon, undergd,
Au, Ag, Cu
Prod: 5 tons
Under Devel

MANSY COPPER & GOLD MINES Box 500, Wallace Pres: Oas Belsby VF: Oaberne Belsby VF: Oaberne Belsby Gen Mgr: Sam Peterson Sec: Ruby Brown HANSY MINE, 3 mt SE of Adair, underg Cu, Au, Ag Under Savel

HARRY ANN MIN'S Mackey Opr: Francis Pern MINE, Alder Cr dies, Custer Co, Ag, Pb, Zn

HAYDEN HILL COWS
MUG CO
412 Chronicle Bidg,
Spolane, Wash
Pres: W T Anderson
VP; J B Phillips
Sec: C C Anderson
Gen Mgr: R R Weldenman
PURIM GROUP, Silver Bell,
Coeur d'Alene
(Leased to Silver Dollar Mag)

BECLA MNG CO.

BOX 320, Wellace
Prest. L. J. Randall
VP: J. L. McCarthy
VP & Geol: R. E. Soremeen
Gen Mgr: R. Wayman
Bec: John R. Maitheree
Parch Agt: R. G. Hull
HECLA MINE, Barke, Fb, Za.
Idle
900-TON FLOT MILL, Germ
Mill Supt: Norman Sasher
Accayer: J. M. Simpson

MEATH, TED D Box 117, Fairfield BORN SILVER GP, Little Smoky dist, Camas Co, Au, Ag, Pb, Za Under devel AUDRY OP & BETTT, Soldier dist, Camas Co, Ag, Au Ender devel MOUNTAIN VIEW GP, Skeleton Cr dist, Elmore Co, Au, Ag, Under devel

HEINE MINES, INC Meridian, Botse, Bellevos Owner: A L Weine, Belse BELLEVOE GOLD GALENA, Bellevoe, Au, Ag, Cu, Pb, Zn, Mn, V M-TON BEAM IMELTER Idle

HERMADA MNG CO
Twin Springs
Pros: Ernest Oberbillig
Mgr: Gilbert Pearson
VP: Jess Hawley, Jr
Sec-Treas: Carol Oberbillig
HERMADA MNE, 20 mt W of Atlanta,
swrface
Prod: 20 tons per month
TALACHE CUSTOM PLOT MILL,
Atlanta

CONSOL MNG CO
Gyde-Taylor Bidg, Wallace
Pree: Frank J Lucke
VP: Henry C Smith
Sec-Treas: W A Callaway
Gen Supt: Tibor Klobusicky
HIGHLAND-SURPINES MANE,
Kellogg, 15 mi SW of Kellogg,
undergd, En, Pa, Ag
Prod. 36 tume
Mine Foreman: Allan W Barrett
300-TON FLOT MILL
Mill Supt: Robert A Rice

HILLTOP MINE
122 S let St, Pocatello
Mgr: Joe Hamilton
MINE, Lemhi Co, Au, Ag, Pb, Cu

EOPE SILVER LEAD
MNG, INC
Box 182, Chark Fork
Pres: Glenn C Lee
VP: Ed Groenig
Sec-Trens: L P Larson
HOPE MINE, Undergd, Pb, Ag, 2a
Foreman: E T Shields
Eagn: Harold Shields
186-TUR FLOYT MILL

HORNSILVER MNG & MLO CO Day Bldg, Wallace Pres: W.H. Hanson MINES, 3 mt S of Wallace, Ag, Ph Uniter devel

BULL LEASE

Wallace

Oen Mgr: B J Bull

Purch Agt: August Volsolini

CEM & FRISCO MINES, Gern, Ag, Pb,

En

Supt: Harry Voltolini

100-TON FLOT MILL

Sunt: Pauste Voltolini

NUMPS OF GOLD MINE Wallace Owners: Lee Enthart & Richard May MINES, 15 mi E of E of Oregrande undergd, Au Little

HYPOTHEEK MHG & MLG CO 510 Bank St, Wellnee Pros: R. L. Braimard Mgr: R W Kingebory HYPOTHEEK MINES, Ringston, Au, Ag, Po, Supt: J T Kingebury Edie KING OF PINE CR MINE, W of Pine Cr Under devel

IDAHO BENYLLIUM & MICA CORF Box 194, Deary Pres: Leo J Manon VP: Glen L Evans Séc: John A carver, Jr Gen Mgr: Arley Hasner MUSCOVITE MINE, Avon dist, 10 mil No Doary, undergé & surface, mion, beryl Mine Engr: Albert & Smith, Jr

IDAHO-CANADIAN DREDGING COMPANY Box 2127, Boise Pres & Gen Mgr: H B Murphy VP: Miles M Young Sec-Treas: Goorge E Murphy Gen Supt: Willard J Bennett MINE, Box B6, Cafeade, 75 mi N of Boise, placer, monasite, ilmenite, garnet & sircon Prod: 50 tens

IDAHO-CONTINENTAL MINE Bonners Perry MINE, Port Hill dist, Boundary Co, Ag. Co, Pb, Za

IDANO CUSTER MINES, INC
Box 460, Wallace
Prest Elmer Swamm
VP: O O Miller
Sec: B F Magnuson
DAHO CUSTER MINE, 10 mi
S of Clayton, Pb
100-TOW MILL

IDAHO GARNET ABRASIVE CO Ferrwood
Owner & Oper: Lowell Thompson
Aust Mgr: Everett Thompson
Sec: Hershel Trips
EMERALD CR DIOGINGS, 8, mi 5
of Fernwood, placer, garnet
Prod: 8,000 tons per yr
100 TON JAG & CRUSHING PL,
Emerald Cr

IDAHO GOLDFIELDS, INC 1114 W Indiana, Spokane, Wash Pres & Gen Mgr: L A Thompson Sec Treas: James Wilse DONAHOE LEASE, near Kellogg, undergd, Pb, Ag Foreman: E A Cerling BLACK ROCK MINE, wet Geleis, As Idle

IDAHO LAKEVIEW MINES CO 502 Columbia Bldg, Spokane, Wash Pres & Gen Mgr: J L Drumbeller VF: Martin Wildems Sec Trens: L R Gordon Gen Supt: E A McDaniel MINE, Boyview, 8 ms 8 of Lekeview landing, undergd, Fb, Zn, Ag Underdevel 60-TON FLOT MILL Mill Supt: E A Methaniel

IDAHO MINING COMPANY
Box 808, Kellogg
Pres: C Aubrey Grissom
VP: L E Beeson
See & Gen Mgr: Bruce E Alignier
Gen Supt: Othe E Wasland
WASHINGTON-IDAHO MINE, west
fork, Moon Creek, 6 mi NE of
Kellogg, undergå, Pp, Zn, Ag, Cu
Mine Supt: Otto E Haaland
Ender devel

IDAHO-WARREN DREDG CO Centerville Pres & Gen Mgr; A F Baumhoff Soc-Treas: G T Eyman ELK CITY & YANKE FORK MINES 4,000-yd bucket dredge, Am Dredgemater: J h Jokason litte

IDAMONT LEAD-ZINC MINES
CO
3 2323 Lincoln St. Spokane, Wash
Pres: R H Russell
VP: B & Smith
Sec: W B Russell
IDAMONT MINE, Leonia, undergé,
surface & placer
Under deves

INDEPENDENCE & EMPIRE MINES Brise Operator. Oscar Pearson MINES, Bear Creek & Featherville dists, Elmore Ce, Au, Ag

INTERMOUNTAIN MING CO Wallars LATEST OUT MINE, Texas dist, Lembi Co, Ag, Pb, Zn PURTABLE HASS MILL Cap: 500 tess

IRON MT MNG CO, INC Box 523, Weiser Pres & Gen Mgr: Prank Mortisser Sec: Claudia J Merritt MORTIMER GROUP, 30 ml N of Weiser, undergd, Pb, Ag, Cu, Zu, Au Umbr davai

J S PLACER Garden Valley Operator: George Zesi MDNE, Grimee Pase dist, Beine Co, Au, Ag JOHNSON MINING COMPANY
1220 N 11th St, Boisse
Owner: S C Johnson
MIDDLEMAN CLAIMS, Feart, El
of N of Boise, undergs, An, Ag, Po,
Zn
Mine Supt: Jack Taylor
Under devel
10-TON FLOT MILL
Mill Supt: He Ubank

JORDON PLACERS, INC Boise WHARTON PLACER, Boise Basin Dist, Boise Co, Au, Ag

K & D MNG CO McCall RUBY MEADOWS MINE, Warren dist. Idaho Co, Au, Ag

KING OF PINE CR MNG CO
612 Chronicle Bidg. Speknae, Wash
Pree & Gen Mgr; C C Anderson
VP: E H Carleon
Sec: L Howe
MINE, Wallace
Idle

KLEESATTEL MINE

KUBESCH, JAMES B Sweet Home, Oregon FREE GOLD, DUTCH MILL MINES, Pierce dist, Clearwater Co, Au, Ag

KWAJALEIN MINE Challin Operator: L V Carothers MINE, Yankee Perk diat, Cueter Cox

LAKEVIEW LEASE 647 Peyton Bidg, Spokase, Wash Owner: R B Asstin WEBER MINE, 21 ms E of Athel, surface, Ag Au Prod: 9,000 tons per year Mine Foreman: One Meyer

LARSON, R W
South Fork Lodge, Golden
SOUTH FORK MINE, 11 mt E of
Golden, underground, Au, Ag

LATEST OUT MINE
Oper: Harry Stout, Gilmere
MINE, Teyas dist, Lembi Co, Ag.
Cu, Pb

LAWRENCE CONS MINING CO Clark Fork Pros: C 1 White Sec: C 1. White, Jr LAWRENCE GROUP, Clark Fork, Pb. Ag. 5b 50-TON COMC

LEAD BLOSSOM MMG & MILLING COMPANY 422 High St, Wallace Pros: Jerry Graber VP: Margaret Denny LEAD BLOSSOM MINE, Wapdner, undergd, Ag, Pb

LEADVILLE MINE
Leadure
Oper: Hayea, Hayes & Zook
MINE, Junction dist, Lembi Co, Ag. Po

LEONARD BROTHERS Silver City via Murphy Gen Mgr; F L Leonard PAUPER GROUP, 2 mi SE of Silver City, undergd, Au, Ag. Ca 2-TON GRAV-AMAL MILL.

LEONARD, MRS R H Silver City via Murphy DAVEDSON GROUP, 2 ms E of Silver City, undergd, Au, Ag, Lille EMPIRE OROUP, 2 1/2 mt E of Silver City, undergd, Au, Ag

LEONE MARIE MINE Ovid Operators: Cambling & Skinner MINE, Bear Lake dist, Bear Lake Co, Ag, Pb

LIVINGSTON MIMES, INC 3310 W 74th St. Sentile, Wash Pros: Harry C Petrie Gen Mgr. Henry Moore LAVINGSTON MINE, Bugharse dist, 16 mt S of Clayton, Ph Under devel 300-703 MILL. LOOKOUT MT MNG & MLG CC Box 838, Kellogg Pres: William Penny Gem Mgr: L & Harrison LOOKOUT MT MINE, Pine Creek, underge, Pb. Ze Underge, Pb. Ze

LUCKY FRIDAY SILVER-LEAD MINEES CO Sox III, Wallana Pres & Gem Mgr: John Schulle VP: Chao E Horring disec: W.J. Emacio LUCKY FRIDAY MINE, Mullan, Hunter dist, Pb, Ag, Au, Cu, Zo Prod: 100 Sum Mine Supi; David Elder

LUCKY SIX MINING CO
Judianta
Free: Donald Cantril
Sec-Treas: John Longsteig
Gen Supt: Alex McLincosh
Ch Engr: Barold Freeman
45 MINE, Clarkie, J mi SW of
Clarkie, undergd & Pincer Ti, Fe, Au
Under dewel
41 MINE, Southwich, 6 mi E of
Southwick, undergd & placer, Ti,
Fe, Au

MACKAY HXPLOR CO 4212 Franklin Rd, Boise Pres & Cen Mgy: W P Barton VP: D E Ball Sec: M. J Burton EMPINE MINE, 9 ml W of Mackay, Cu, Au, Ag Under Gereil

MASCOT MINES
BOX 880, Kellings
Pariners: Bell, Rorgaard &
Fagers
Purch Agi: D Boil
LITTLE PHYTEBURG MONE, Pine
Cr, undergd, Ag. Ph. En
Supt: Inar Norgaard
Foreman: W B Jarvey
150-7008 PLOF MILL
Supt: N D Resse

MAYPLOWER GOLD MINES, INC. Placerville Pres & Gen Mgrt J B Eldridge VFD H M Eldridge Not. G R Eldridge MINE, J m I NW of Placerville, undergd & placer, As. Ag. monasite, rare earths Prospecting

MEGREGOR MINING CO
Rox 45, Catalde
Pres: Mc Jecobeon
Sec: Mcc Grace Jacobson
McGREGOR, PACIFIC MINES,
Cataldo Gulch, An, Ag, Cu, Pb, Fe

Merae Tungeten Corp Billione Pres: RJ McRae VP: Hubert Martin Gen Supt: Marry M Sargent SNOWBIRD & RED BLUFF MINES, Stibette, 10 and W of Big Creek, Valley Co, undergd, Husbnorite, achiestic Fresh: 35 Man. Mine Supt: James Collect Under dersal 36 TON FLOT-GRAV MILL, Big Cr

METALINE & PIME CREEK CONSOL MING CO Scott Bidg, Wallane Press Balanley Ranton VP: J B Haffner Sect L J Handarii Aust Sec: II F Magneson

METALLICS UNLIMITED
Box 0, East Ely, Nev
VALLET VIEW MINE, Star Rt,
Dubois, 35 ml NW of Mudlake,
undergd, Cu
linder dewet

THE MINE'S, INC
621NS, Bolse
Pres & Geo Mgr. Ramon S Carlton
Sec. HV Packer
Geol. Robert Charboneau
Baw B.-3, RITAMAE 9:-3, 3 mt W
of Bellavos, undergd, Pb, Ag, Zn, Au
Under devel

MONSANTO CHEMICAL CO St Leuis, Wo PHOSPHONUS PL, Soda Springo Pl Mgr: S L Whiteoide (See Mo. South) MORMON CITP MINE Pearl Oper: OA Paul MINE, West View dist, Gem Co, Ag, Au, Cu, Pb, Za

MOUNTAIN KING MINE
Box 83, Halley
Mgre: Fred & Earl Shirto
MDIE, Seafoam dist, Custer Co,
Au, Ag, Cu, Pb, Zh

MULLAN-DOYLE LEASE Wallace HULTNER TAILINGS, Hunter diet, Shoehone Co, Ag, Pb, Zn

MABOB SILVER LEAD CO Box 800, Kellogg Pres: TR Jones Gen Mgr: C C Dunkie MINE, Wallace, Pb, Zo BOG-TON FLOT MILL Accept: C V Barto

MATIONAL MIMES, INC Box 277, Malad Pros: W L Baker VP & Gan Mgr: C A Dye See: Blythe G Clemons SENTINEL MIME, 20 mt NE of Howe, Za, Po, Ag

NEW HILARITY MNG CO Box 27, Spokane, Wash Pree: R W Neyman VP: W Breinard Sec-Treas: E K Barnes Asst Sec-Treas: E M Borjessan MINE, Box 843, Wallace Foreman: Eugene C Iverson Bits

NIXON, WM A ESTATE-Rocky Bar Opr: Oscar Pearson EMPIRE GROUPS, Elmore Co

NEW HOPE MINE
Katchum
Oper: Eugene Norten
MinE, Warm Spr dist, Blaine
Co, Ag, Pb

NICHOLIA MINE
Gilmere
Oper: Joe Zook
MINE, Spring Mt diet, Lemhi Co,
Ag. Pb

NORTH FORK MNG CO Box 459, Wallace Pres: L 5 Edwards VF: Veroon J Rustinson See: Earl Chilcott MINE, 18 mt N of Wallace

PAYMASTER, INC 611 Peyron Bidg, Spokane, Wash Pres: Frank N Marr Sec: C D Randall MINE, 31 mt SW of Arco, undergd

PENMAN MINE CLAIMS
ofo Rose & Brattain, 1800 SE
22nd Way, Mercer Island, Wash
CLAIMS, Orogrande, 4 mi SE of
Orogrande on Dixis Road, undergd, At
Idia

POLARIS MINING CO
Box 330, Wallace
Pres: L.J. Randall
VP: J.L. McCarthy
Ses: ELOF Echwm
Gen Mgr: R. W. Neyman
Treas: J.R. Matthew
Gwold: R.E. Sovenson
Purch Agt. R. C. Hull
SILVER SUMMIT MINE, 7 mi W
of Wallace, undergd, Ag, Cu
Mine Supit George Grismer
Mine Foreman: A P MacDonald
FLOT MILL
Mill Spot: N J Sather
Mill Foreman: J.O. Dalgleich
(See American Silver Ming Co, Rainhow Ming & Mig Co, Ltd)

PREMIER STAR MNG CO Box 138, Osbura LUCRETIA CLAIMS, Hunter dist, Shunhoos Co

PROFILE TAMABACK MINES c/o E P Slovařp, 300 SW 4th Ave, Portland, Ore Pres: C E Thompson VFA den Supt: N T Abetein Sec: E P Slovarp CENTRAL GALENA GROUP, Yellow Pine, 70 mi NE of Cascade, undergé, Ag, Pb, Zn, Au, Cu Idle

PUMICE, INC
Box 517, Idaho Falls
Pres & Gen Mgr: R L Milner
VP: R Seal McDonald
Elec Engr: Cliff E Emerick
Bec: Robert E Lee
Geol: V E Camousi
MINES, T mit E of Idaho Falls,
undergd, pumice
Frod. 180 tons
Mine Supt: H A Harmon
1,00 TON CRUSH-SCREEN PL,
Ammon, 8 mit E of Idaho Falle

QUIGLEY MNG SYNDICATE 1128 10th Ave N, Seattle 2, Wash Pres: W J Logue Geol: James M McDonald QUIGLEY MINE, Hailey, 6 1/2 mi E of Hailey, undergd, Pb, Ag, Zn Under deveil

RAINBOW MNG & MLG CO, LTD Ben 489, Walland Pres: H C Mowrey Sec-Treas: W A Callaway RAINBOW St GROUP, Evolution dist, Cu, Ag. Pb, Zn Under devel by Polarie Mng Co

RAMSHORN MINES CO
333 Felt Bidg, Salt Lake City, Utah
Pree: W W Murray
Sec: Lee Eager
RAMSHORN & BEARDSLEY MINE,
Bayhoree, To mi NW of Mackey, Ag,
Pb, Cu
(Leased to Bayhorse Minee, Inc)
Effic

RARE METAL MINES, INC E 601 Crown Ave, Spokane, Wash Pres: Arthur L Hooper MINE, Bonner Co, Au, Ag

RED BIRD MINE
Clayton
Partners: Buchman, Breckon &
Norden
Gen Mgr; J A Norden
MINE, 8 mi NW of Clayton, undergd,
Fb, Ag
Prod: 300-400 tons per month

RED LEAF GP Halley Opers: E W Sowers, Stanley Johnson MINE, Mineral Hill & Camae Dist, Blain Co, Ag, Fb

RICHARDSON PLACERS Box 756, Salmon Agt: Mrs JR Shoup Mgr: W H Shoup PLACERS, 33 mi W of Salmon, Au, Ag idis

ROCK, TOM Silver City MINE, undergd, Au, Ag Under devel

SAN FRANCISCO CHEMICAL
CO
Montpoller
Pres & Gen Migr: D L King
VP: W derome Taylor
Sec & Purch Agt: Res L Jones
WATERLOO MINE, E of Montpoller,
phosphate rock
Supt: C S Stephens
CUMBERLAND MINE, E of Monipoller,
Supt: John S Wright
Under deveil

SCHULTZ, HARRY A Idaho City Stage, Boise RAINBOW GROUP PLACER, Au

SHAMROCK #1 MINE Colden Opr: H W White MINE, Ten Mile dist, Idaho Co

SIDNEY MINING CO
102 Sidney Bidg, Kellogg
Pres: M C Brown
Sec-Treas: F E Marler, Jr
Ges Bupt: C A McKinley
Mech Engr: Zane Smith
Purch Agt: A G Plippe

SIDNEY MINE, 15 mi S of Kellogg, undergd, Ze, Ag, Pb Prod: 2081 tons Foreman: Ed Coe 300-TON FLOT MILL, Plac Cr dist Sund: C A McKinley

SIGNAL MINING CO
410 Main St, Kellogg
Pres: H C Alway
VP: John B Penney
Sec: Wendall R Brainard
Gen Supt: Eugene C Iversoh
MILARITY GROUP, 7 mi W of Kellogg,
undergd, Zn, Pb, Ag
Mine Supt: Eugene C-Iverson
Under devel

SILVER BANNER MNG CO Tabor Bidg, Wallace Pres: B W Stewart VP & Gen Mgr: B K Garrett Soc: H J Hull Treas: C W Six SILVER BANNER MINE, 8 ml E of Wallace Under devel

SILVER BUCKLE MMG CO c/o F E Scott, Box 1088, Wallace

SILVER DOLLAR MNG CO Box 176, Spokane, Wash Pres: E Z Johnston Sec: W T Anderson SILVER DOLLAR MINE, Wailace, SW of Osburn, undergd, Au, Ag, Cu, Pt. 8b

SILVER STAR MINES
Box 498, Wallace
Pres: M D Anderson
Sec: A J Teske
Treas: Roy H Kingsbury
MINE, S of Dayrock, @aoshone Co,
Ph, Ag

SILVER STAR-QUEENS
MINES, INC
BOX 194, Haley
Pres & Gen Mgr: N T Davis
VP: R E Kreuger
Sec-Treas: F L Johnson
OLD MINNIE MOORE & QUEEN OP
THE HILLS MINES, I 1/4 mM wof
Bellevue, undergd, Fb, Ag, Za

SILVER STILL MNG CO Weiser Pres: Lee Thorson VP: Kenneth Sisck Sec: E W Horner SILVER STILL MINE, Mineral, 30 mi N of Weiser, Ag, Cu, Pb, Zn Elle

SILVER SYNDICATE, INC
BOX 1170, Wallace
Pres & Gea Mgr: W M Yeaman
VP: Ray Morrison
Sec-Trees: A H Featherstone
SiLVER SYNDICATE MINE, 10
mi from Wallace, undergd, Au, Cu,
Pb, Zu, Ag
Operated by Sunshine Mng Co

J R SIMPLOT CO
Continental Bank Bidg, Boise
Pres: J R Simplot
Exec VP: R 1 Trouell
VP: Grant Kilbourne
Auditor: John Dahl
Mgr, Mines: Geo McHugh
PHOSPPATE DAV, Pocatedlo
Mgr: L M Buhler
PORT HALL MINE
Aset Mgr: John Kobe
Supt: C W Sweetwood
Res Engr: Maurice Hansen
LAVA HOT SPH MS PROP
Mgr: Keith Madill, Challis
PLUGRSPAR OPER
Mgr: Keith Madill
BARLTE PROP, Halley
(See Colo, Nev)

JR SIMPLOT CO,
FERTILIZER DIV
BOR 912, Pocatello
Fres: JR Simplot
VP: Grant Kilbourne
Gen Mgr: L M Buhler
Ees: Mrs Helen Schwake
Furch Agt Austin Richins
GAY MINE, 22 mi from Fort Hall,
surface, phosphate
Mgr: John Kobe
Mine Supt: Charles W Sweetwood
Engr: Maurice Hansen

SIMMONS, D W 502 Ash St, Boise QUEEN MINE, 7 mt W of Atlanta, placer, Au SMOTHERS, A P

Shoup ELKHORN BAR PLACER, 93 md # of Shoup, dragline placer, Au, rare earths,

of Shoup, dragume piacer, Au, vare earths, BHR BROKEN HALTER MINE, 50 mi W of Shoup, undergd & surface, CaF₂, Under devel

SNOOSE MINING CO
Box 67, Halley
Preu & Gen Mgr: A M Jamen
VP: W F Smith
Sec-Treas: R S Bacom
SNOOSE MINE, 2 1/2 mi SE of
Hailey, undergd, Zn, Fb, Ag, Au

SOUTH BUTTE MINE Mackay Opr: Edward Hersinger MINE, Bayhoree dist, Custer Co, Ag, Cu, Fb, Za

SOUTH MOUNTAIN MMG CO Jordon Valley, Oregon GOLCONDA MINE, S Mt Mng dist, Owyhee Co, Ag, Pb, Za

SPOKANE-IDAHO MNG CO
oil Peyton Bidg, Spolmae 8, Wash
Press: Frank N Marr
VP: S H Clinedinet
Mgr: Brower Dellinger
Sec: C D Randall
Trees: Charlee E Marr, Jr
Ch Engr: John H Wilson, Jr
CONSTITUTION MINE, Box 939,
Kellogg, 6 1/2 mi SE of Pinehurst,
undergd, Za, Pb
Prod: 180 tons
Mine Supit: C F Redding
180-TOM PLOT MILL
Mill Supit: Norman Armeson
DOUGLAS MINE (See Douglan Mng
Co)

SQUAW PEAK MINE.
McCall
Parture: FB Fracier,
L L Fracier, R Fracier &
A R Roger
MINE, 25 ml W of McCall, undergd
& curface, As, Pb, Zo, Ag, Cu, WOg
Supt & Mgr: Q W Fracier, Weter
Under dewei

STOKES & SHOUP, KYANITE EXPLOR BOX 754, Salmon Gen Mgr: G E Shoup Ast Mgr: Earl Stokes SPARK PLUG LODES, 8 mi W of Salmon, surface, kyanise Under devel, producing

SUCCESS MINING CO Wallace Pres: Henry L Day SUCCESS MINE, Wallace, Zn, Po, Ag, Sb

SULLIVAN MNG CO
Box 320, Wallace
Pres: S A Easton
VF: L J Randall
Sec: Ira A Robeon
Treas: JR Matthews
Purch Agt: R G Hall
STAR MINE, Burke, undergd,
Zo, Fb, Ag
Prod: \$15 ions
Mine Foreman: Lee Meeserly
Mine Engr. R E Sorenson
50-TON PLOT MILL, Burke
Mill Supt: N J Suther
Mill Supt: N J Suther
Mill Supt: W J Suther
Mill Supt: W J Suther
Mill Foreman: Robert Miller
ELEC SMELTER, Silver King
Supt: W O Woold
Mgr: JB Haffner
Purch Agt: Henry Biotti

SUNSET LEASE
Day Bldg, Wallace
Gen Supt: R Farmin
SUNSET MINE, 10 mi N of
Wallace, undergd, Zn, Pb

SUNSET MINES, INC
BOX 869, Kellogg
Press: O Bardahl
VP: David Harvey
Gen Mgr: R E Lomas
Soc-Treas: C B Merritt
LIBERAL KNRC MINE, II mi W
of Kellogg, undergd, Zn, Fb, Ag, Au
Prod: 60 tone
Mine Foreman: Paul Crawford
125-TUN FLUT MILL
Mill Sugs: Franklin Sharp

SUNSHINE CONS, INC
102 Sidney Bidg, Kellogg
Pres: W M Yeaman
VP: W T Simons
Sec: F E Marler, Jr
Gen Mgr: N M Smith
SUNSHINE CONS MINE, 6 ent E
of Kellogg, undergd, Ag
(Under devel by Sunshine Mng Co)

SUNSHINE MINING CO
BOX 1080, Kellogg
Press: Robert M Hardy
Gen Mgr: Ross D Leisk
Gen Supt: John Edgar
Dirs: Joshua Green & C M Hull
Asst to Gen Mgr: Robert M
Hardy, Jr
Purch Agt: N J Oeborne
SUNSHINE MINE, 5 mi E of
Kellogg, Evolutien diet, undergd,
Ag, Pe, Cu, Sb
Gen Supt: John Edgar
Ch Engr: J C Durham
Foreman: Charles Angle
1400-TON FLOT MILL
Supt: Wayne D Gould
Assay: M F Scott
SILVER SYNDIC ATE MINE
(See Silver Syn Ming Co)
SUNSHINE CONS MINE
(See Silver Syn Ming Co)

SUNSHINE PLACER
c/o Sapps Grocery, Lewiston
Mgr: C R Williams
PLACER, Idaho Co

SUN VALLEY LEADSILVER MINES, INC
BOX 57, Ketchum
Pres & Gen Mgr: R L Roundy
VP: L O Lindberg
Sec & Purch Agi: J R Thornton
BLUE KITTEN MINE, S mi W e7
Ketchum, undergd, Pb, Ag, Zn, Au,
Prod: 20 tons
Mine Foreman: F W Lease
Mine Engr: C C Livingston
Under dave!
75-TON FLOT MILL, 5 mi W of
Ketchum
Mill Foreman: George W Stokes

TALACHE MINES, INC
211 Yates Bidg, Boise
Pres: A H Burroughe, Jr
VP: B K Burroughe
BOISE-ROCHESTER & MONARCH
MINES, Atlanta, undergd, Au, Ag,
Gen Supt: P T Peterson
Elec: H A Harriman
350-TON FLOT MILL
Supt: JN Groomer
LONE PINE MINE, Idahe dist,
Ag, Pb, Zn
(Leased to Lone Pine Mng Co)

THORNTON MINING CO Garden Valley Press: Charles Thornton COLUMBITE MINE, 16 mi E of Garden Valley, surface, columbite, mica, sumarekite, monazite Prod: 50 tons 50-TON GRAY MILL

TREASUREMONT MNG CO
1129 10th Ave N, Seattle, Wash
Pres & Gen Mgr: W J Logus
Sec: M A Logus
Geol: James M McDonald
QUIGLEY MINE, 6 1/2 ml E of
Hailey, undergd, Fb, Ag
Mine Supi: Al Linderman
Under Awei

TRIUMPH MINING CO
Triumph
Pres: J W Swent
VP: E H Snyder
Ewo: John W Hamilton
Gen Mgr: L M Robinson
Elec Engr: Don Downard
Geol: J M Barrett
Purch Agt: Nerbert Shear
TRIUMPH MINE, Triumph,
undergd, Pp. Ag, Zn, Au, Cu
Frud: 300 tone
Livingston
300-TON FLOT MILL
Mill Supt: M A Jorgensen
Asst Mill Supt: Marvin Seldin
Assayer: A L Hall

TURTLE MINE
Challs
Owners: Leo Divis &
Elray N Kimball
MINE, Mackey, I má from
Bayhorse, undergd, Ag, Pb, Cu
Under devel

TYEE MINING CO Spokane St Dock, Seattle, Waeh RED RIVER & SUNRISE MINES, Elle City, Au, Ag, dragline-dredge Gen Mgr: C J Schastlan Supt: S K Coates

UNITED MERCURY MINES CO
Box 448, Boise
Pres & Gen Mgr: J J Oberbillig
VF: H H Oberbillig
Sec: Edmund Keely
MINES, Cinnibar, Valley Co, 68
mi E of McCall & 80 mi NE of Cascade,
undergd, Hg
Prod: 60 tons
Mine Supt: Earl Moosmen
150-TON ROTARY FURNACE

VINDICATOR SILVER-LEAD MNG CO Wallace Pres: WJ Logus VP; Mrs A M Logadon Sec-Treas: HF Magnuson VINDICATOR MINE, 2 md E of Mullan, undergd, Pg, Ag, Zn

WESTERN CONS MINES, INC
Box 1406, Boise
Pres & Gene Jack
VP: John F Miller, E J Mulholland
Sec: A C Wells
Gen Supt: E Albrecht
Geol: L N Rinchold
Purch Agt: B Andrews
OPHIR MINE, Rocky Bar, 66 mi
N of Mountain Home, Undergd, Au, Ag
Mine Supt: V Macky
Under davel
50-TON FLOT MILL
Mill Supt: Sidney Carr

WEST STAR MINE Coeur d'Alene Opr: M N Seeley MINE, Lelande dist, Shoshone Co, Ag, Pb, Zn

WHITEDELF MNG &
DEVEL CO
Clarks Fork
Pres & Gen Supt: Compton I
White, Jr
VP: W von Cannon
Sec & Gen Mgr: Compton I
White, Sr
White EDELF MINE, 2 mi N of
Clarks Fork, undergd, Ag, Pb, Zn
Under devel
30-TON FLOT MILL.

WHITE KNOB MNG CO Newhouse Bldg, Bait Lake City, Utah Pres: W C Page HOMESTAKE, COPPER QUEEN MINES, Alder Cr. Mackay, Pb, Zn, Ag

WILBERT MINING CO
316 Kearns Bidg,
Sait Lake City, Utah
Pres: R. J. Nogan
VP: M F O'Reilly
Sec: O'C Larson
DAISY BLACK GROUP, Howe, 35
mi E of Howe, undergd, Pb, Zn
Like
75-TON CONC
Edie

WILLIAMS, HARRY M
Box 781, Caldwell
VALLEY VIEW MINE, Texas dist,
Lemhi Co, Ag, Pb

WONDER LODE CLAIMS, INC-Box 756, Salmon
Pres & Gen Mgr: G Elme Shoup
VP: La Shoup
See: Fred H Snook
Asst Cen Mgr. William R Shoup
Gen Supt: William Monger
WONDER LODE-IDAHO PRIDE
MINE, 31 mi E of Salmon on
Highway 28, undergd, Cu, Ag, Au
181a

WONDER MINING CO Guiden Gen Mgr. Ernest Butler WONDER MINE, 2 mt SE of Golden, Undergd, Au 15-TON GRAV MILL Idle ZANETTI BROS
WALLECK OSBURN &
DOBLOCK TAILINOS,
Evolution dist, Shoebone Co,
Ag. Cu, Pb. Zn
INTERSTATE-CALLAHAN MINE,
Beaver dist, Shoebone Co, Ag. Pb. Zn

ILLINOIS

ALCOA MINING CO, PLUORSPAR DIV PAIRVIEW MINE, Rosiehare Pb, Zn. Pluorite Prod: 5, 600 tens per me Purch Agt. Brice Crow Bupt: WH Harrison Engr: 5 G Bousman Meck Engr: B E Efner Geol: A H Sutton Hinds a FLOT MILL. Supt & Met: W C Lay Aesa; V C McDonald (See Bouth, Orogon & East)

AMERICAN COLLOID CO Merchandice Mart Plans, Chicago 54 Pres & Gen Mgr: Pasi Bechiner VP: W D Weaver Aust Sec: Jeanette Salmon Gen Supt: Edwin Busfield Purch Agt: Roy H Harris (Sec 5 Dak, Wyo & South)

AMERICAN SMELTING &
EFINING CO
FEDERAL SMELTER, Federal,
Fb
Mgr: L J Beck
Supt: James H Vose
SAND SPRINGS PLANT, Sand
Springs, Okla, sinc dust
Supt: S J Laktoe
(See Aris, Cote, Calif, Idaho, Mont,
New Mex, Utah, Wash & East)

AMERICAN ZINC CO
OF ILLINOIS, SUBSID OF
AMERICAN ZINC, LEAD &
SMELTINO CO
HILISDRY
SMELTINO & PROCESSING PL, Zn
SUPL: HR Wampler
Met Div Supt: JF Clark
Mgr: B W Curry
Gen Foreman: HJ Collen
Mech Engr: M A Bonadarer
Met: Cacar Hauseil
Assay: Orville Retiedge
Annual Prod:
12,000 tons Amer proc sinc oxide
2,700 tons Fr prod sinc oxide
7,100 tone sinb sinc
(See Amer Einc-Ill, Texas, Amer ZincTenn, South, Amer Zinc, Load & Smelt,
Wash & Central)

CALUMET & HECLA, INC People's Gas Bldg, 127 & Michigan Ave, Chicago (See Mich & Wisc)

EAGLE PICHER CO, MNG
& SMELTING DIV
Galena
Mgr: C O Dale
GRAHAM MINE, undergd, Za, Po
GRAHAM CENTRAL MILL, Flot
IIIIe
(See Wisc, Okia, Contral, Aris &

HECKS CREEK PLUORSPAR MINING CO Elizabethtown DOUGLAS MINE, Pope Co. III, CaF₂

INLAND STEEL CO
Pirst Natl Bank Bldg, Chicago 3
Pres: Joseph Block
VP, Raw Materials. PD Block, Jr
Sec: Graydon Megan
Mgr, Ore Mines: R D Satterley
Aset Mgr, Ore Mines: I IM Graff
Gool: A T Broderick
Safety Engr: E C Loonard
(See Mich & Minn)

INTERRAT'L MINERALS &
CHEMICAL CORP
20 N Waches Dr. Chirage &
Free: Louis Ware
VPic: O Woyers, M. B. Lockwood,
A. N. Into, P. D. V. Monning, J.T. E.
Bisshop, B. J. Dussbock, Boward F.
Bushrick
VP & Trens: A.R. Cahill
VP & Gen Counsel: E.D. McDougal, Jr.
VP & Chief Engr: T. M. Ware
Corp Sec: C. M. Edwards
Purch Agent: J. P. Burrows
(Sec Central, Aris, Colo, Mont, N. Mex,
S. Dak, Wyo, South & East)

MATTHIESSEN & HEGELER
ZINC
LESCHE
LASALLE WORKS, Zo
Prec. H D Carwe
VP & Gon Mgr: C R MacBrayne
Sec: Es Carwe
Gen Supt: R Wanthoublan
Mai: P Millier
Elec Engr: A Lundborg
Mech Engr: H Larson
Safety Engr: V Newah
Purch Engr: A La Flamme
SMEALTER Metary
Capacity: 30,000 tone per yr
Supt: R Wanthoublan
Aget Supt: R Miller

MINERVA OIL CO, MING DIV
Myere Bidg (Box 53h)
Eldorado
Pres: Joseph Desloge
Sec: Berkley Jones
Gen Mgr: Gill Montgomery
Geol: C W Shaw
Purch Agt: 6 J Kelly
MINERVA et MINE, Cava-in-Bock,
undergd, CaF2, Za
Prod: 325 tons por dey
Mine Supit C F Callahan
Mine Foreman: Joseph Deggeit
Mine Supit C F Callahan
Mine Foreman: Joseph Deggeit
Mine Supit C F Callahan
Mine Foreman: Joseph Deggeit
Mine Supit C F Callahan
Mine Foren Wille
Mine Supit C E Andergom
Assayer: CB Rash
CRYSTAL MINE, Ra L
Elizabethtown, 4 ml NW of Cava-iaRock, undergd, met grade CaF2
Frod: 540 tons
Fisant Mgr: I V Robertson
Mine Supit D B Holbrook
405-TON HANE & FLOT MILL
Mill Supit D C Spees
Mill Factures Herman Sum
Shop & Vd Foreman: Troy Barnerd
JEFFERSON MINE, 8 ml W of
Boatdlare, undergd, CaF2
101e
ROSE CREEK MINE, 8 ml E of
Merod, undergd, CaF2

MORTON SALT CO 120 S LaSalle St, Chicago 3

OZABE-MAHONING CO, MINING DIV Roskilare, pe me NE of Roskilare, underge, CaF_B, Pb, Za Mine Supt: V G Smith Mine Engr: EA Brecke FLOT MALL, Roskilare Mill Supt: H A Sperberg Assayer: Wilter Millhouse (See Colo, Di, Okla, & East)

ROSICLARE LEAD & PLUORSPAR MWG CO Rosiciare Supt: A H Cronk MINE, Pa, En, CaP₂

TRI-STATE ZINC, IRC Galera, Mgr: M H Loveman Gen Supt: V C Allen BAUTHCH & BLACKSTOWE MINE, Underga, Za, 70 860-TON FLOT MILL

U. S. GY PSUM CO.
300 W Adams, Chicago 5
Ch of Bd. C N Shaver
Press: C M Nassle
Press: C M Nassle
VP's: B P Sadler. Edward Rembert,
J M Nobl, E W Carey
Sec & Anat Treas: A W Irwin
Anot Seca: M A Lang, L W Austin
Anot Tess: G W Clarke
Ch Engr, Mines: J F Marverd
Gree Mich, Oola, Calif, Colo, Mend,
Rev, Tox, Utah, Wash, South & East)

VICTOR CHEMICAL WORKS
140 W Jockson Blvd, Chicago 6
Pres: Rothe Weigel
(See Calif, Ment, South & East)

EONOLITE CO
138 Le Salle St, Chicago
Proc: A T Kearney
VP'e: John B Meyer, Dayton L
Presty, Daniel J Beene, Jee A Kelley
Purch Agt: Lee Q Frans
Star Mont & South)

MICHIGAN

CALUMET & BECLA, INC
I Calsanet Ave, Calamet
Pree: E R Lovell
VP: A E Peternam
Gen Mgr AS Kromer
Purch Agi: L % Decald
AMMEEK, ALLOUEZ, CENTENNIAL,
RECQUOIS, EXERAEGE, PENDRAULA
A SENECA MINES, Calamet, undergé
Cu
Mgr: C A Camphell
Chief Engr: H S Boenale
Ch Geol: T M Invoderich
Mech Engr: B R Spencer
Elec Engr: A Hill
Safety Engr: Ge Gedge
9,000-TON GRAV FLOT MALL
Supi: R K Poull
CALUMET & HECLA SMELTER,
Hubbell, Mich, S rev Cu furnaces
Prod: 8,000,000 lbs rewerb Cu
per mo
Met Raymond Marsotte
Assay: R Gerts
Gee Wicconsin)

CERTAIN-TEED PRODUCTS

CORP
Bon 4, Grand Rapido
Pres: R G Linare
VF: P E Fischer
Sec: A O Graves
Pl Mgr: A H Tensushed
Mech Engr: A Lund
Purch Agent: J I Trolley
GRAND BAPDO MINE, 4 md SW
Grand Rapido, undergd, gypoum
Prod: 700 tone per day
Mine Supt: R Nielsen
Ast Mine Supt: J Saplie

THE CLEVELAND-CLEPPS
IRON CO, ORE MING DEPT
ISTOPHISMS
Gen Mgr. G J Helt
BACK-HO AN OPEON, Shiperesing, Misch, Fe
Mgr. Mich Mineo. JS Westwater
Diel Supp., Surface Mineo. BLC Swancea
OHO-WEBSTER MINE, Baraga Co,
surface
Aegt Supt: K C Oleon
SPIES-VIROIL MINE, Iron Co, undergd
ATTHENS MINE, Marquette Co, undergd
Supt: T A Knoppile
CAMBRIAN-JACKSON, Marquetie Co,
Undergd
Supt: T A Rooppile
CAMBRIAN-JACKSON, Marquetie Co,
Undergd
Supt: W R Atkins

CAMBRIAN-JACKSON, Marquette Co, Undergd Supt: W R Atkins CLIPPS SHAFT, Marquette Co, undergd Supt: O Marjama LLOYD MINE, Marquette Co, undergd Supt: W R Atkins MAAS MENER, Marquette Co, undergd Supt: W R Sunder MATHER MINE, Marquette Co, undergd Acet Supt: CR Sundergd Sundergd Supt: CR Sundergd Supt: CR Sundergd Sund

GLOBE IRON CO
Jacksow, Ohio
Chol Bol: E A Jumes
Pres: J H Junce
VP: J W Morgan
Sec: W Ffamenff
Con Mgr: W R Dooll
GLOBE-CORNELL MINE, 2 ml
N of Iron Mi, surf, Fe
Frod 200 tune

COPPER RANGE CO MINING DIV, Painsedale Pres: M F LaCroix VP: P F Beaudizi Gen Mgr: D E Moulds Chief Engr: M G Meeyers
Met: Rose Gandide
Master Mech: W J Andrews
Safety Engr: P Vernam
Purch Agont: S B Baliny
CHAMPION MINE, 16 ms 3 of
Houghten, undergd, Cu
Prod: 1, 000 tens
Mine Supt: V J Capebiance
Mine Engr: Peter Steinen
PLOT MILL, Preds
Supt: I T Bowman
Fureman: Maxt Saimleen.
(See While Pine Capper Ca)
(See East)

BANNA COAL & ORE CORP Mgr of Mich Mines: SE Quayle, Iron River, Michigan MINES, Fe IRBUYELAND RESERVE Idle WAUSECA MINE (See Minn & Contral)

HAHHA IRON ORE CO May of Mich Mines: 5 E Quayle, from River, Michigan MINES, Fe HAWATHA MINE HOMER MINE CANNON MINE WAKEFIELD Gov Minn A Contrall

INLAND STEEL CO
IRON ORE OPER
Mgr. Raw Materials Dept:
C B Jacobo, Chicago
Mgr. Ore Mines: R D Satterley,
Ishpenning
Anst Mgr. Ove Mines: If M Graff,
Ishpenning
SHER WOOD MINE, Iron River
Supt: E Warron Peterson
BRISTOL MBNE, Crystal Palls
Supt: W P Reed
CAYLA MINE, Crystal Palls
Supt: W P Reed
CREEN WOOD MINE, Ishpeming,
Supt: R W Edwards
(See Minn & 111)

INTERNATIONAL SALT CO, INC MINE, Detroit, undergi Gree Exsti

JONES & LAUGHLIN STEEL CORP, MICHIGAN ORE DIV Negaunce, Mich, Fe Mgr. R. W. Brund TRACY MINE, Negaunce, Mich sindergd Supt: R. L. Ballont Asst Supt: H. J. Christy Master Mech: A D. Leone Engr: WA Benson Under davel (See Minn & East)

MAHLAND ORE CO from Hiver Mgr of Mines: S E Quayle MINES, Fe CHICAGO RESERVE WHIYESIDE HESERVE

NATIONAL GYPSUM CO QUARRY & PLANT, National City, gypsum PI Mgr: C H Hill Quarry Supt: R H Alles (See Texas, Central, South & East)

NORTH RANGE MNG CO
Negaunes
Pres & Gen May: R S Archibald
VP: R Q Archibald
Ch of Bd: F P Book
See: E S Holmgren & C W Wicele
Ch Eller. G H Peterson
BLUESERRY MINE, Inhperming
Supt: S A Nicoleon
Capt: G Philippi
Purch Agl. P A Alevander
BOOK MINE, Alpha
Supt: Charles Coole
CHAMPION MINE, Champion
Supt: J A Nicoleon
Capt: Bryon Farragh
WARNER MINE, Amea
Supt: C Kirkpatrick
Capt: C Kirkpatrick

PICKANDS MATHER & CO GOGERC DISTRICT, Ironwood Gen Supt: W A Knoil Aset Gen Supt: C D Balley Diet Mng Engr: J L Sharrer Ch Clerk! B D Kenney Diet Safety Supr: George Gerry FOUNDSTOWN MINES CORP,
NEW PORT MINE, Ironwood,
Unining round
Supt. H L Schieber
FOUNDSTOWN MINES CORP
ANVIL-PALMS-KEWEENAW MINE,
Beesemer, Undergil
Supt. H L Schieber
Ast Supt. P Torreame
Ast Supt. P F Torreame
PLYMOUTH MINING CO, PETERSON
MINE, Beesemer, Undergil
Supt. H L Schieber
Ast Supt. P F Torreame
PLYMOUTH MINING CO, LOOMIE
MINE, Wakefield, Surface
Supt. E R Tyler
SUNDAY LAKE HIGH CO, SUNDAY
LAKE MINE, Wakefield, Undergil
Supt. RD Rodge
PALKER MINE, Wakefield, Undergil
Supt. RD Rodge
FALKER MINE, Wakefield, Undergil
Supt. RD Rodge
MENOMINEE DISTRICT, Campain
Gen Supt. H J Richard
Didt Ming Engr. R Brewer
Aust Geni Supt. W E Seppanen
Ch Clerk: S K Brew
MENOMINEE DISTRICT, Campain
Gen Supt. B J Richard
Didt Ming Engr. R Brewer
Aust Geni Supt. W E Seppanen
Ch Clerk: S K Brew
MENOMINEE DISTRICT, Campain
Gen Supt. T J Richard
Didt Ming Engr. R Brewer
Aust Geni Supt. W E Seppanen
Ch Clerk: S K Brew
MENOMINEE DISTRICT, Campain
Gen Supt. L J Richard
Didt Ming Engr. R Brewer
Aust Geni Supt. W E Seppanen
Ch Clerk: S K Brew
MENTERR MON CO., DAVIDSON
MINE, Iron River, Undergil
JAMES MONG CO. JAMES MINE,
Iron River, Undergil
VEROMA ROWG CO. BUCK &
LAWRENCE MINES, Cauptan, Undergil
VEROMA ROWG CO. MINE, PICKANDO
MATHER & CO., Managing Agenta,
Crystal Palls, Surface
Ese Mine A Wiss!

REPUBLIC STEEL CORP
PENOREZ MINE, tronwood, undergit
Fig.

Mine Supt: A J Christenson
Aust Mine Supt: Joseph Zuraw
Ch Engr: E W R Butcher, Dubuh.
Mine Foreman. Oncar Heist
Mach & Elec Engr: Victor Crego
Assay: John Trevarther
Prod: 800,000 tone per year
TOBIN MINE, Crystal Falle,
Undergi, Fe
Mine Supt. E M Auderson
Mine Foreman: Emil Johnson
Ch Engr: E W R Butcher
Mech & Elec Engr: Victor Crego
Assay: Jil Mayer
Prod: 432,000 tone per year
(Bee Minn, Central & East)

RICHMOND IRON CO iron River Mgr of Mines: S E Quayle MINES, Fe RICHMONE MINE (See Central)

U S GYPSUM CO ALABASTER, Surface, gypsum Works Mgr: M H Van Oronum (Sec Calif, Ill, Colo, Okia, Mons, Nev, Texas, Utah, Wash, South & East)

U S STEEL CORP. OLIVER
IRON MNG DIV
GOGEBE CDSTRICT
Supt: P W Denton, Jr
Asst Supt: R D Lindberg
Ch Mng Eagr. J C Howhere
Ch Chemist: H P Achais
Shop Foremen, Maintennance:
J L Dibble
GENEVA MÜNE, Ironwood, Mich,
Undergd
Asst Mng Capt: L Gribble
(See Minn, Utah, South & Essal)

WHITE PIWE COPPER CO
White Pine
Pres: Morris F La Croix
VP & Project Mgr: Harold S Ewelds
Acst Project Mgr: St HC chimeyer
Electrical Supt: J A Roller
Sec: J Roller
Sec: J Roller
Sec: J Rollen Ackroyd
Gen Works Supt: H W Jud8
Geol: J R Band
Safely Engr: M P Trainor
Parch Agent: Clyde W Woesley
WHITE PIME MINE, cs., White Pine
Prod: 10,000 tone per day
Mine Sept: Richard F Mose
Mine Foresman: Larry Garfield
Mine Engr: Charles F Maheriam
FLOTATION Mill.L, Capacity - M, 300
Hop per day
Mill Supt: Walter A Hamilton
SMELTER, REVERBERATORY,
Capacity: 75,000,000 tone per day
Smeltr Supt: Beheart C Wilson

MINNESOTA

BEAR CREEK MNG CG 3336 Republic Ave, Minnes Dist Geol: C H Burgeou (See Calif., Wash & Ency.)

BUTLER BROS

Gen Mgr of Minre: R W Whitney MINES, Cuyuna Range, Hinn, Fe, Hin ALGOMA RESERVE, Coyuna, ICH HUNTER, WHITMARSH RESLAVE Welford Twp. Idie KONA, FED RESERVE, Cuyana MERRITT GROUP, MANGAMESE-TROMMALD Idie MINES, Mosabi Rango, Minn, Fe ALEXANDRIA RESERVE, Baikan AROMAC, THEODORE RESERVE Nashwauk Twp, BURRALL RESERVE, Hibbing CAROL, LARUE, MACE & RESERVE, Nachward, Machemat Top, Nashwash, Mashwash Tup,
IIIs
GALBRAITH, GALBRAITH AMMEX
MINE, Mashwash Tup
HARRISON, MALOBE, HOADLLY, ,
NORTH HARRISON, MORTH
HARRISON MORTH
HARRISON MORTH
MINE, Nashwash, Noshwash Tup, Cooley
PATRICK ANN, PATRICK AMEZE,
KEVIN, LANGDON, DAVID, SEVIDER
GROUP MINE, Cooley, Grossway Tup
WYMAN MINE, Nashwash Tup
HIDWEST GROUP MIME, Meashwash
Nashwash Tup Nashwank Twp MACKILLECAN MENE, Nashwani

CHARLESON IROS MEG CO
Power Bidg, Box 335, Nikhing
Pres & Gen Mgrs E F Remov
VP & Gen Supt: C B Remov
Purch Agt: A T Steele
IRON OFFER TIMES from stockpile
I, 000-TON GRAV MILL, Charleson Supt: & C Henry

THE CLEVELAND-CLIPPS
IRON CO, ORE MISG DEPT
Gen Mgr: G J Holl
MINNESOTA OPER, Hibbing, Fe
Mgr, Minn Mines: H J Leach
Gen Supi: W A Pakikala
AGNEW MINE, Hibbing, wadsrgd
Supi, Undergd: Hel Viant
SARGENT MINE, Recewtin, undergd
& surface
Supi, Undergd: Hel Viant
Supi, Surface: Paul P Swanson
HAWKINS MINES, Nashweak, surface
WASHING PLANT
Supi: William LeChrir Supt: William LeChir HILL-TRUMBLE MENE, warth, WASH & HI-DENSITY PL. Calumet Supt: A E Hill HOLMAN-CLIPPS MINE, TROUBLE Supt: J J Poucault
WASH & HI-DENSITY PLANTS, Coloraine J J Foucault Supt: 3 J Foucaux
WANLESS MINE, Bubl, eurface
Supt: G D Giuliani
CANISTEO MINE, Celerative, surface
Supt: Ronald Pearson

CONSUMERS ORE CO -Hibbing
Gen Mgr of Minee: R W Whitney
MINES, Messhi Ronge, Fe
BARGENT RESERVE, Columns

Supt: Ronald Pearse (See Mich & Central)

COONS, E W. CO Grant & First, Hibbing Pres: W C Cohoe VP: W E Wilson Sec: A I Foster Gen Supt of Mines: Duane S Myers

GENOA SPARTS, EVELETH, LINCOLN "A", SIDNEY, JULIA, S COMMODORE, Virginia

DOUGLAS MINING CO Hibbing
Gen Mgr Mines: R W Whitney
MINES, Mesabl Range, Pe
DOUGLAS, DUNCAN GROUP MINE,
Bellan Two Balkan Twp NEVILLE RESERVE, Stunts Twp, Idle SHENANGO REBERVE, Chisbolm

Idle (See Central)

WALEY-VOUNG MNG CO HALLY-YOUNG MSG CO
2233 First Ave, Hibbing
Pres: E A Young
See: D O Haley
ELBERN MINE, 2 and SE of Freser,
Minn, surface, Fe
Supt: Leo Cashen
Trees: Billing Schemens Foreman: Phillip Seli

HANNA COAL & ORE CORP
Gen Mgr of Minn Minest
R W Whitney, Hibbing
MINES, Fillmore Co. Fe
O BLY, H BLT, BREIMER,
FINNSTERMACHER, FREEMAN,
HADLAND, HAPNER, R JOHNSON
LASSELL, LEON J MONES, MEYER
NASH, K OLSON, R OLSON, BATHBURN,
RICK, SIMON, C TART, W TART,
Forrestville Twp, BloomBeld Twp,
Beaver Twp Forrestville Twp. Bloomheid 1 wp.
Besver Twp.
MINES, Cuyuna Range, Fe & Mn
ALSTEAD, ARRO, NORTH HILLCREST
GROUP MIRE, Irentea
ANNE, SETERS, PONTIAC GROUP
CENTURY Trongmaid RESERVE, Trom

CROFT, MEACHAM GROUP RESERVE, Crosby
Lilis
FEIGH MINE, Irosbus
HUNTINOTON MINE, Irosbos
LAND & COL RESERVE, Wolfred

NORTHLAND RESERVE, RAIMS

NON PHILAND REMETER, named Lake Twp, Isla LOUSE MDVE, Irondale Twp MALLEN MINE, Irondale Twp MARCOO MUNE, Tremmania RICE RIVER RESERVE, MORRISON, Spenocer Twp, Althin Co

Lette SECTION 6 MIME, Irondale Twp SNOWSHOE MINE, Irondale Twp SOUTH HILLCREST MINE, Irond MINES, Meabl Range, Fe ALLEN ROSSUM RESERVE, Greenway Twp.

Idle . ARGONNE, LEACH, PERRY GROUP MINES, Nashwauk Twp CARLZ GROUP MINE, Stunts Twp, HARTMAN, MARR GROUP RESERVE, Bass Brook Twp MAJORCA RESERVE, Greenway Twp, SCOTT RESERVE, Greenway Twp,

SILVER, ALPENA GROUP RES unorganized Twp 58 1/2, SCOTT

HANNA IRON ORE CO Gen Mgr of Minn Mines:

a W Whitney, Hibbing
MINES, Cuyana Range, Fe, Mn
BARROWS RESERVE, Crow Wing Twp, CUYUNA, DUNN, POLE, TABERT GROUP RES, Oak Lawn Twp

Idle
M W I RESERVES, Crow Wing Twp,
Long Lake Twp, Nokay Lake Twp,
Oak Lawn Twp GLORIA, ZENO RES, MANGANESE,

Idie RABBIT LAKE RES, Cuyune, Idla OMAHA RES, Oak Lawn Twp

hile ROWE RES, Irondale Twp MALKER RES, Nobay Lake Twp YAWKEY RES, Crosby, Capu

PORTSMOUTH GROUP MINE, Croshy MINES, Mesabi Ranga, Fe BECKFELT, FIRNEGAR, LUNDRIGAR, NATCHEZ, PAREGAMA GROUP RES, Base Brook Tup

PARCEL S RESERVE, Coloraine BILLINGS RESERVE, France SECTION IS MINE, Stunts Twp (See Mich & Central)

HANNA ORE MINING CO Hibbing
Gen Mgr of Minee: B W Whitney
MNES, Mesabi Range, Pe
BOVEY-DeLAITTRE, PARGO
GROUP RES, Grand Rapide Twp,
Idle

MESABI CHIEF, MISS #3, STEPN GROUP MINE, Nashwauk Tup, BRUNT RESERVE, Mt Iron

BRUNT RESERVE, M: Iron,
Lije
BUCKEYE, JENNISON GROUP
MINE, Arbo Twp
ENTERPRISE MINE, Virginia
FRANTZ, SHIRAS GROUP RES,

1654 NORPAC, IMPRO B. SARGENT GROUP RES, Hibbing NORTH UNO RES, Stunts Two Idle
WABIGON, THORNE GROUP RES,
Buhl, Great Scott Two
(See Central)

INLAND STEEL CO. 1RON DRE OPER ARMOUR No 1 & No 2 MINES, Ironton Supt: A T Anderson (See Mich & Central)

JACKSON IRON & STEEL CO BRADLEY MINE, Iron Mt. Fe Prod: 33,600 tons per year (Operated by Edward C Bradley & Sens) (See Central)

JESSIE H MINING CO

JONES & LAUGHLIN STEEL CORP MINNESOTA ORE DIVISION, MINNESOTA ORR. JAVESSOM.

Mgr. II F Kullberg

Mgr. II F Kullberg

Asst to Mgr. C H Sleeman

Ch Acct: F S Tonnesan

Proj Engr: W F Gasper

Res Geol: T E Stephenson

Eastern Dist Supt: J F Lindhan

MINES, Messabl Range, Fe,

Open Pit Open Pit HILL ANNEX MINE AND MILL, Dist Supt: J F Linden
Mine Supt: R O Branden
Mill Foreman: R L Abercrounds
LONGYEAR MILL & MINE, Wibbing Dist Supt: JF Linden Mine Supt: Wm Bail LIND-GREENWAY MINE LIND-OREENWAY MIRE
COLKRAIME
Under devel
Under devel
Dist Supt: J P Lindon
Mine Supt: R O Brandon
COLUMBIA MINE & MILL, Virginia
Dist Supt: P W Kruse
ECHLEY-PETTIT MINE & MILL Gilbert
Dist Supt: P W Kruse
Mine Supt: H W Gillespite
WENTWORTH MINE & MILL., she
Dist Supt: P W Kruse
Illes Mich & East)

JUNIOR MINING CO Virginia Pres: A.B Tomesich HECTOR MBIE, Biwabik, Messhi Range, Surface, Fe

(Operating substitiony of Haley-Young Mining Co) Keewatin MINISSEPPI #1 MINE neer Keewatin, Minister Rouge, ourface

MONTREAL MINING CO 300 Christie Bldg, Dulum 2 Gen Mgr: Frank J Smith (See Wisc & Central)

MOORE, S W CO MOORE, S. W. CO Brooklyn Md, Hibbing Pres: W.S. Moore Sec: H.A. Nelson Gen Mgr: H.E. Resea Gen Supit: John Johnson Geol: J.V. Evrett Mach Engr: J. H. Madsen Office Mgr: H. J. Konnody FRINGLE MINE, I mi. W. of Wing surface, from one purface, iron o Proc. 2, 500 tons
Rine Supt: S E Keteri
HEAVY MEDIA MILL,
Mill Supt: W F McDermell
JUDSON MINE, 1 uni S of Be surface, tron ore MARISKA MINE, I mi HE of OH ourface, from ore Prod: 3,000 tons PILOT ANNEX MENE, 4 ms WE of Mt Iron, surface, from ore HANNA MENE, 4 ms HE of Mt from, ourface, from ore YAWKEY MINE, 3 ms NW of Virginia, surface, tron ore YAWKEY CRUSHER MARGARET MINE, 1/3 mi Wol

MORTON ORE CO MONTON ON A CO Hibbing Geo Migr of Mines: It W Whitney MINES, Mesabl Range, Fe MORTON, SOUTH EDDY GROUP MINE, Stuntz Twp Mine Supit: L M Bredwold Asst Mine Supit: M A England Mane Forerman: John German (See Central)

OGLEBAY WORTON & CO NORTHERN OFFICE, 300 Christis Bind, Dwinn VP. Frank J Smith Ch Ing Engr: D S Young Dev Engr: T V Cauring Elec Engr: W Victoha Mech Engr: L E Crowby Parch Agit A J Windi MONTREAL MINING CO, Agent Montreal Mining Co Supir: C A Bjork Supt: C A Bjork Acet Supt: C F Guenth ST JAMES MINING CO, manager for St James 1 ST JAMES MINE, Aurora Supt: B L Knudsen Gen Pareman: T H Triboy (See Wisc & Central)

PACIFIC ISLE MINING CO PACIFIC ISLE MINIMO CO
(Includes the Hedman Ming Cob
2521 First Awe, Wibbling
Pres: H H Harrison
Gen'l Mgr: John D Boentje, Jr
Supts: Arne O Tuomale, K H Chisholm
Office Mgr: D J Keeler
Gen'l Counsell E T Magor
MINES, Mesabi Range, Open Pit
YORK YORK
LAMBERTON, INNCHIVE
UNO-KERROBOUP, MORTH BHIRAS,
WACCOTAH, MINORCA-LARRIN,
MISSABE MOUNTAIN, South Lease, VIVIAN-GRAHAM BREW-CROKTON-SYME, Co.

PHILBIN MINING CO Hibbing

Gen Mar of Minee:
R W Whitney, Hibbing
MINES, Mesabi Hange, Pe
WEGGUM, SOUTH LONGYEAR GROUP MINE. M

PICKANDS, MATHER & CO
TOO Sellwood Bldg, Dulum B
Gen Mgr: A D Chisholm
Ast Gen Mgr: J C Motcalf
Mgr of Eng. O L Yanch
Mgr of Taconite Ope: C F Trowbridge
Asti Mgr Taconite Ope: C F Trowbridge
Asti Mgr Taconite Ope: C F Trowbridge
Asti Mgr Taconite Ope: B W Bornstrom
Mgr, Taconite Ope: B W Bornstrom
Un Mech Spi Tac Ope: B W Bornstrom
Un Mech Spi Tac Ope: B W Bornstrom
Un Mech Spi Tac Ope: B W Bornstrom
Un Michael
Bapyr of Safety & Ind Relations
E A Anundaen
PHISHINO DIST, Mesald Range, Wibbing
Gen Supt: E J Fearing
Asst Gen Supt: M L Bradt
Dist Mng Eng: R W Sullivas
Ch Clerk: Lee McRutty
Dist Safety Super: C E Hague

CRETE MINING CO, ALBANY MINE

4 WASHING PL, Hibbing, surface &
undergi
Supi: TR Tregembo
HOYT MINING CO, SCRANTON MUNE,
CRUSHING & WASHING PL, Hibbing,
surface
Supi: E C Sponberg
MAHONING ON & STEEL CO,
MAHONING MINE, Crushing, Hibbing,
surface
Supi: B D Webb
UTF'A MING CO, CARMI CARSON LAKE
MINE & CRUSHING PL, Hibbing, surface
Supi: W D Webb
UTF'A MING CO, OANUBE MINE &
BENEFICIATION PL, BOVEY, surface
Supi: L T Lang
BALKAN MING CO, OANUBE MINE &
BENEFICIATION PL, Grand
Rapide, surface
Supi: D H Thombe
WESTERN MINING CO, WEST HILL
MINE & BENEFICIATION PL, Grand
Rapide, surface
Supi: L M Becker
EAST MESABI DIST, BUWABIK
Gen Supi: T C Thelaman
CORSICA IRON CO, CORSICA MINE &
CRUSHING & WASHING PL, Eleor,
surface
Supi: J E Coughlin
BIWABIK MING CO, BIWABIK MINE &
BENEFICIATING PL, BIWABIK, surface
Supi: J M Shielde
LAKE MING CO, EMBARRAS MINE &
CRUSHING FL, BIWABIK, surface
Supi: G C Watts
Asst Supi: R W Bell
ELY DIST, Vermillion Range, Ely
Supi: B S Richards
VERMILLION MING CO, EERITH MINE
Ely, undergd
Supi: B S Richards
VERMILLION MING CO, EERITH MINE
ELY DIST, Vermillion Range, Croeby
Gon Supi: J P Schemmel
Diel Ming Engr: George Chamberlin
Chief Clerk: S A Munson
CUYUNA DIST, CUYUNA Range, Croeby
Gon Supi: J P Schemmel
Diel Ming Engr: George Chamberlin
Chief Clerk: S A Munson
CUYUNA ORE CO, MAHONMEN MINE &
CRUSHING PL, Croeby, surface
Supi: M F Seare
SAGAMORE ORE MING CO, SAGAMORE
MINE, CRUSHING ADRIEDE CGRP,
RABEIT LAKE MINE & CRUSHING PL,
Croeby, Surface
Supi: M F Seare
Ges MICh & Wish

PHILBIN MNG CO Hibbling Om Mgr of Mines: R W Whitney, Hibbling MINES, Meabs Range, Fe WEGGUM, SOUTH LONGYEAR GROUP MINE, Hibbing (See Central)

PIONEER MNG CO
BOX W, Blwabik
Pres: Pairick Buller
VP: Frank S Bergstrom
Ch of Bd: Emmet Buler
Soc: F J MeArthur
MARY ELLEN MINE, 1/2 mi W
of Blwabik, surf, iron ore cone
Prod: 800,000 tons cone par year
Mine Supt: B F Maneson, Jr
Mine Foreman: Frank Press, Jr
HV MEDIA MILL

REPUBLIC STEEL CORP
HUBBING
SUSQUERANNA MENE, Hibbing,
surface
Mine Supt: JH Hocking
Asst Mine Supt: M G Woodle
Engr: B K Dutton
Day PELForeman: John O Pearson
Night Pit Foreman: Elwood Ferris
GRAV CUSTOM WASHER, Hibbing
Mech Engr & Elec Engr: Victor Crego
Assay: A J Mayheu
Prod: 1,00,000 per year
ST PAUL MINE, Keewalin, surface
Mine Supt: JH Hocking
Asst Mine Supt: M G Woodle
Mng Engr: B K Dutton, Hibbing
Mng Pureman: E M Murphy
GRAV MILL.
Mech & Elec Engr: Victor Crego
Assay: A J Mayheu
Prod: 350,000 tens per year
STEVENHOUN MINE, Stevenson, surface,
Fe
Mine Supt: JH Hocking
Asst Muse Supt: M G Woodle
Mng Engr B K Dutton
Prod: 350,000 tens per year
STEVENHOUN MINE, Stevenson, surface,
Fe
Mine Supt: JH Hocking
Asst Mine Supt: M G Woodle
Mng Engr B K Dutton
Pit Foreman: L J Marisello

GRAY MILL Prod: 235,000 tons per year Mech & Elec Engr: Victor Crego Assay: A J Mayhou (See Mich, Central & Eset)

RESERVE MINING CO
(Owned by Republic & Armco
Steel Corps)
& Co
Consultant: Oglobay, Norton
& Co
RESERVE MINE, Babbitt, taconite
Mgr Oper: B J Lianey
Act Mgr Oper: John Dunlop
Engr: F W Erickson
Mine Supit A F Torreano
CRUSHING & PILOT PL
Prod: 300,000 tons pellets per yr
Supit: E Furnese
PELLETIZING PL, Beaver Bay,
Under cumst
Mgr, Const: E C Lampman
Supit: K M Haley
(See Central)

ST JAMES MINING CO ST JAMES MINE, Aurora, Fe Supt: B L Knudsen (See Central)

SKUBIC BROS CO
705 8th Ave N, Virginia
Pres: Teny Skubic
Sec: Frank Skubic
VIRGINIA MINE, Eveleth, 3 mi S
of Virginia, undergd, Fe
Mine Supi: L Swanson
1212
300-TON HV MEDIA MILL, Jiggs

RHUDE & FRYBERGER
Bon 779, Hibbing
Partners: Jo Rhude,
R M Fryborger
TROY MIBE, Eveleth, Mesabi Range,
surface
BOEING MINE, Hibbing, Mesabi
Range, surface, Washing Pl
PENNINGTON MIBE, Ironton,
Cuyuna Range, surface, HMS Pl

SNYDER MINING CO
1101 Alworth Bidg, Daluth
VP & Gen Mgr: O A Sundnese
MESABI RANGE BQ OFFICE,
Chisbuim
Gen Supt: C O Rudstrom
Ch Engr: A C Borgeson
Assi Ch Engr: Rudolph Ekar
Mech Supt: E F Eldam
Safety Engr: F J Sullivan
Purch Agt: C J Heshaway
WEBB MINE, Hibbing, surface
iron efe
Prod: 4,000 tone
Mine Supt: J J Maney
Mine Foreman: A E Des Roeier
Mine Engr: John Kunter
WHITESIDE MINE, Buhl, eurface,
Iron ove
Prod: 7,500 tone
Mine Supt: B M Baker
Mine Foreman: Abert Stakel
Mine Engr: Dean Swaim
CRUHHING PLANT
(See East)

SOUTH AGNEW MNG CO Hibbing Oen Mgr of Mines: R W Whitney BINES, Messahl Range, Fe SOUTH AGNEW, AGNEW #2 GROUP MINES, Stants Twp Mine Supt; L M Bredvold Asst Mine Supt; M A Englund (Has Contra).

STLVIA DEE MNG CO Hibbing Pres: David D Haley MICHAEL MINE, Buhl, Messahi Range, surface

U S STREL CORP,
OLIVER IRON MNG DIV
Wolvin Bldg, Duluh 2
Pres: R T Elstad
VP; Operations: J E Machamer
Asst Sec, US Steel Corp: N P Clarke
Trens: R L Larson
Comp: R B Henley
VP, Bis & Ping: W N Matheson, Jr
VP, Mineral Dev: L J Severeon
Mgr; Mng Engr: N A Moberg
Cons Gool: R H B Jones
Super of Ore Movement: P J Perry
Mgr, Beneficiation: A T Koesen
Asst to Mgr, Beneficiation:
K F MacAlpine

Ch Engr: C N Bailey
Dir of Ind Rel: R O Hawkanson
Purch Agi: G A Engel
Ch Grader: G H Sharbach
Mgr. Geol Inves: R W Marsden
EASTERN DIST
Gen Supt: J N Johnson
Last Gen Supt: J M Johnson
L B Campbell
Bupt of Maint: J A Vitthum
Asst Supt of Maint: C R Peterson
W Hyde
Ch Chemiet: I R Leroh!
Ch Mg Engr: J T Nolan
CANTON MINES, Biwabik, Mesabi

CANTON MINES, Blwabik, Mesabid
Range, surface
Supit: D Hartley
EVELETH MINES
Supt: K H McInnis
Asst Supi: C V Wargstrom
Ming Cap, Vir, Minn: O J Makinen
MT IRON MINE, PILOTAC MINE,
Mt Iron, Miseabid Range, surface
Supit: I H C Rubow
Acet Supit: L E McKensie
PIONEER MINE, SIBLEY MINE, Ely,
Vermilion Range, undergd
Supit: Pioneer & Sibley Mines:
L E Dick
Ming Cap, Pioneer Mine: J J Pouchnik
Acet Ming Cap, Pioneer Mine: R JROWE
Acet Ming Cap, Pioneer Mine: R JROWE
WETWORN

METworni
Mng Cap, Sibley Mine: JD Warner
ROUCHLEAU & AUBURN MINE, Virginia,
Mesabi Range, surface
Supt: E V Nelson
Asst Supt: P D Hoover
PILOTAC PLANT, Mt Iron, Mesabi
Range, surface, taconite,
Under devei
SOUDAN MINE, Breitung Twp, Vermillon
Range, Undergd
Supt: E M Holmes
Mng Cap: G J Nemanich, JF
EXTACA FLANT
Supt: M Wiselke
Asst Supt: G R Wynne
HIBBING-CHERHOLM DIDT
Gen Supt: J Hearding, Jr
Asst Gen Supt: J Chisholm
Supt of Maint: C R Burton
Asst Supt of Maint: J J Schoenig
Ch Mng Eap: W Wolff
Ca Chemist: O L Forebreig
Ch Mng Eap: W P Wolff
Ca Chemist: O L Forebreig
Ch Mng Eap: W P Wolff
Ca Chemist: O L Forebreig
Ch Mng Eap: W P Wolff
Ca Chemist: O L Forebreig
Supt: W Been
Mng Cap: A F Hulme
Asst Mng Cap: A W Kealy
HILL-RUST MINE, Hibbing,
Mesabi Range, surface
Supt: N G Helland
Asst Supt: W J McGuire
RHEBHAN MINE (UKRUP
Supt: M J POTSMATH
Asst Supt: E C Silver
PILLEBURY MINE & Designated
Truck Production Operation
Supt: H M Pickering
FRASER MINE, Freser, Mesabi
Range, surface
Supt: B A Priedman
Asst Gen Supt: M E Johnson
MCNOC MINE, Chisholm, Mesabi
Range, surface
Supt: B Ben
MULL-RUST CRUSHING & SCREENING
FLANT
Gen Plant Foreman: P A Cheever
CANISTEO DIST
Gen Supt: E A Priedma
Asst Supt of Maint: R N McIndeo
ARC TURST CRUSHING & SCREENING
FLANT
Gen Plant Foreman: P A Cheever
CANISTEO DIST
Gen Supt: M E Johnson
Ch Chemist: E R Bechtel, Jr
Ch Mng Engr: L E Battles
Supt of Maint: R N McIndeo
ARC TURST CRUSHING & SCREENING
FLANT
Gen Plant Foreman: V V Ahola

T O Olsen
KING MINE, Coleraine
Supt: J H Harrison
Asst Supt: A F Savage
PLUMMER MINE, Coleraine
Supt: J H Harrison
Asst Supt: A F Savage
PLUMMER MINE, Coleraine
Supt: W Beebe
(See Mich, Utah, South & East)

YOUNG, E A INC
2223 First Ave, Hibbing
Pres: E A Young
VP & Supi: Nels Kempainen
Sec: D D Haley
MINNEWAS MINE, 2 mi £ of
Virginia, Mesabi Range, surface
& undergé, Fe
Poreman: A N Heikkits

ZONTELLI BROS, INC
IFONION
Pres: Emil Zontelli
VP: Henry Zontelli
VP: Henry Zontelli
Sec: Anne V Stang
Gen Mgr: N E Hill
Gen Shys! Henry Zontelli
Mexi John Simmon
Geoli Elion LaSart
Mech Engr: Francis Chase
Elec Engr: Dan Doshan
Furch Agi: Ernest Kutaner
VIRGINHA MINE, N of Ironton,
Cuyuna Range, surface, Fe
MINNESTA MINES
GRAHAM #I MINE, Mesaba Twp,
Mesaba Range, surface
MANGAN-JOAN MINE, Irondale,
Cuyuna Range, surface
MANGAN-JOAN MINE, Irondale,
Cuyuna Range, surface
MANTIN LEAN GRE STOCKPILE,
Ironton, Cuyuna Range
MERRITT LEAN ORE STOCKPILE,
Trommald, Cuyuna Range
MANUEL MINE, Croeby, Cuyuna
Range, surface
(Mew Will)

MISSOURI

ALLIED CHEM & DYE CORP, GEN CHEM DIV Owenswille Ministers (LAY FIELDS Supt: RA Parker (See Colo, New Mex, South & East)

AMERICAN ZINC, LEAD &
SMELTING CO
SI Louis
Pres: BI Young
YP: RA Young
Sec: W J Matthew
MINE OPER, ORE BUYING &
LAND DEPTS, Ben 870, Joplin
Dist Mgr: John J Inman
Gen, Supt: OL Green
Geol: Dan R Stewart
Met: RA Ammon
Mech à Safety Engr: W F Netseband
QUICK SEVEN DIV. Neck City
(Operated jointly with Brown & Root),
surface, Ze
1, 500-TON GRAV-FLOT MILL,
Neck City
Supt: Jack Gibert
See Amer Zinc-Ill, Central, Amer
Zinc-Teon, South, Amer Zinc, Lead &
Shelting, Okla, Wash & Texas)
B F & B MINES, INC

B F & H MINES, INC
2020 Main St. Joplin
Pres: Harris S Smith
VP: W D Hughes
Sec: Myra C Smith
BULL FROG MINE, 2 mi NW of
Joplin, undergd, Zn. Pb
Prod: 202 tons
Mine Supt: Harris S Smith

BADGETT MINE
STRIPPING CORP
BOX 696, Joplin
Free: Rogers Badgett
VP: T Brown Badgett
Wech Engr: Roy Evans
KELNOR MINE, 3 mi W of Joplin,
surface, Pb, Zn
Frod: 500 tone
1800-TON GRAV MILL
Ede

CADET MINING CO Cadet Mgs: A H Long MINE & MILL, Wash Co, Mo, surface, bartis

CARTER, J E, MINING CO Putoul Pres & Gen Supt: Geo L Carter VP: Wm Carter Sec: G F Cresswell MMG OPER, Wash Co, surface, Bartle Prod: 185 tuns

CURTIS, L Flexcher BARITE PITS, Wash Co. Pb. Zn. DALE MINING CO DALE MINING CO
all Kentland, Neceho
Partners: D P & G E Klepinger &
J A Worley
Elec Engr: F E Orifith
Mech Engr: Lawrence Trenshen
MHNES, DUNGY, SHINN, ROBISON,
PATTERSON, Stark City & Aroma,
Undergd, Py, Zn
Prod. 250 time
Mice Kongerman, Boyd Mitchell Mine Foreman: Boyd Mitchell 600-TON GRAV-PLOT MILL, Stark City Mill Foreman: Frank Crabb

Desoto MINING CO 226 S Main St, DeSbto MINE & MILL, surface, barite

DICKEY & REYNOLDS MINE & MILL, Wash Co.

DILLINGER, JR (Box 608, Potosi MINE & MILL, Wash Co, surface, barite

PEDERAL MNG & SMELTING (Wholly-owned subsid of Amer Smelting & Refining Co.)
DUTENWEG MINE, Jasper, Pb, Zn Idle
(See Kans, Ohla & Idaho)

PROJO MINING CO 312 Wall St, Joplin Pres: C H Prost VP: R C Coffin VP: R C Coffin Sec: John Frost Gen Mgr: T C King Gen Supt: Dave Simpson Elec Engr: Marvin Henderson EKFRESS MINE, Neck City, 15 mi Not Joplin, eurface, Zn. Pb Prod: 4,000 tons Mine Engr: R McIntyre Under drawl 4,000-TON GRAV-FLOT MILL, Purcell Mill Supt: Henry Sexton

HORNSEY BROS Potovi MINE, 1 mi S Potovi, Wash Co. Undergd, barite 200-TON GRAV MILL Mill Foremen: H R Dale, Ronnie Blair

HOWELL MINING CO Mineral Point MINES, Wash Co, barite

LAWRENCE CO MNG & LAWRENCE CO MNG & MLG CO
316 N Joplin Ave, Joplin
VP: Dave Mattes
MINES, Lawrence Co, Zn, Pb
GRAV-FLOT MILL

MONSANTO CHEM CO MONSANTO CHEM CO St Louis 4 Ch of Bd: Edgar M Queeny Pres: Charles Allen Thomas INORGANKC DIV Gen Mgr: J L Christian Div Engr: W T Durrett MINES & PL, Monsanto, Tenn, elemental phosphorus Pl Mgr: Edward J Bock (See Ida, South)

OZARK ORE CO
OZARK GROUP MINE, Iron Mt.
Undergé à surface, iron ore
Aset Mine Supt. W F Lee
Mine Foreman: Bruno Sectio
Mine Engr. R Pilliard
2,000-TON GRAV MILL
MIII Supt. A E Cameron
Assay: J W Trelour
(See Central) (See Central)

NAT'L LEAD CO NAT'L LEAD CO
BAHOID SALES DEVISION
FOUNTAIN FARM, Potosi,
curface, barite
CIRAY MILL.
Supt: E L H Sackett
SOUTHEAST MISSOURI OPER Box 351, Fredericktown, Pb, Cu, NI, Co I, 350-TON FLOT MILL Actg Gen Supt: J A Rood Ref Pl Mgr: L T Eck (See Calif, Nev, Tex & Central)

POTTER SIMS MINES INC Box 200, Joplin, Mo JASPER & SNAPP MINES, Jasper Co, Zn, Pb SUCKER FLAT & SNAPP MILLS ST JOSEPH LEAD CO ST JOSEPH LEAD CO
Homes Terre
Pres: Andrew Fletcher
Pres: Andrew Fletcher
VP & Trees: G I Brigden
Sec: Rubert Bennett
Div Mgr: E A Jones
Met: E J Haug
Geol: John 5 Brown
Mech Engr: B L Beal
Safety Engr: J L McGregor
BONNE TERRE, LEADWOOD DESLOGE
& FEDERAL MINES, Bonne Tere,
Undergd. PH. & PEDERAL MINES, EVALUATE STATES AND ASSESSED AND ASSESSED 4 GRAY-PLOT MILLS, capaci

4 GRAV-FLOT MILLS, capacity El, 300 tens Gen Mill Supt: T J Clifford Acet Supts: M N Dunlap, E A Dowd, H A Hoffman & H R Stahl BLAST FURNACE SMELTER, Herculaneum
Prod: Approx 100,000 tons Pb per yr
Div Mgr: W T isbell
Asst Supt: JO McLellan
User East)

ST LOUIS MNG & MLG CORP BOX 508, Joplin
Pres: Edwin B Meissner
Sec: Edwin B Meissner, Jr
Purch Agt: C H Issace
MINE, 6 mi NW of Joplin,
undergd, Zn, Pb
250-TON CUSTOM MILL

SHENANDOAH-DIVES MNG CO 616 Finance Bldg, Kansae City Pres: J W Oldham (See Colo)

SUPERBAR CO Patavi
Pres: Geo L Carter
VP: G F Cressavell
Sec: Floyd Carter
Gen Supt: Russell Degonia
GRINDING MILL, Mineral Point

TERRACE MINING CO Potosi Pres & Gen Mgr: Dall B Groves VP: Julia E Floyd Sec: Robert D Evans TERRACE MINE, 7 mi N Potosi eurface, barite
Prod: 50 tone
Mine Foreman: Harry D Patterson
75-TON GRAV MILL
Mill Foreman: Harry D Patterson

WHALEY & SCOTT Mineral Point MINE & MILL, Wash Co, barite

WOLF, H A MINE & MILL, Wash Co, surface

MONTANA

ACE GP #1 Darby
Oper: Joe Hart & Horace
MiNE, 6 mi W of Alta, WO3,
Cu, Au

ALPS MNG & MLG CO Box 1344, Miscoula Pres: J P Smith VP: Ed Schrieber Sec-Tross: R T Stegner ALPS MINE & ARGO MINE, 22 ml SW of Clinton, undergd, WO₃, Au, Ag Under devel 180-TON GRAV-PLOT MILL,

ALLIED METALS, INC ALLIED METALD, INC 419 Sprage Ave. Spokane, Was Pres: Wm Tanke VP: Frank Mangis Gen Mgr: JF Arnold SYLVIA MINE, Wisdom, Au, Ag Cu, Vh, Zn, Mn, placer & undergd Engr: A C Arnold idle ne, Wash AMADOR MINING CO. Hiwan
Pres & Gen Mgr: James F. Charlton
VP: Merrill Christman
Sec: Arlene Christman
Geol: Irfing G Irving, Robert Nelson
GREEN MT MINE, Dixon, 7 mi W of
Dixon, undergd, Cu, Au, Pt, Pd, Ag
Mine Supit: L J Gruber
Foreman: Howerd Mallow
Pred: 25 Gen Prod: 25 tone 75 TON PLOT MILL Mill Supt; Merrill H Christman

AMAZON MINING CO
Box 313, Coeur d'Alene, Idaho
Pree: A E Lunden
Sec-Trees: Geo M Servick MINE, near Heron, Au, Ag, Cu Mont Agt: Joe Brooks, Noxon

AMBASSADOR MINES CORP
401 Empire State Bidg,
Spokane 1, Wash
Pres: Dale Lamphere
VP: M H Ford
Gen Mgr: M C Wilson
Sec-Treas: E I Fisher
AMBASSADOR MINE, 10 ml SW of
Trout Cr, undergd, As, Ag
Under davel

AMERICAN ALLOY METALS, i Montgomery St, San Francisco 4, Calif

San Francisco 6, Calif Pres: Estey A Julian VP: Frank Eichelberger Sec-Treas: Willis Swan BROWN'S LAKE, IVANHOE MINES, 8 mi NW of Glen, W

AMERICAN CHROME CO AMERICAN CHROME CO
I Montgomery St
San Francisco 4, Calif
Pres: Estey A Julian
VP: Wm K Woodburn
Gen Mgr: John Blay
Sec: Willie A Swan
MOUAT-SAM PSON CHROME MINE,
Nye, 42 mi SE of Columbus, underground, chromite
1,000-TON GRAV MILL
Prod: 1,000 ions Prod: 1,000 tons

AMERICAN GOLD CORP Box 137, Pony Pres: H E Boon Gen Mgr: JF Kitching BOSS TWEED-CLIPPER & ALLIED GROUPS, Pony, Au, Ag

AMERICAN MACHINE & METALS, INC, TROUT MNG DIV Philipsby

Philipsburg
Pree: J C Vanderpyl
VP: C W Anderson
Gen Mgr: L B Manning
Asst Gen Mgr: Roy McLeod
Sec: F C Keating
Gen Supt: Roy V Hamilton
Geol: D Y Meschter
TROUT-ALCONQUIN GROUP,
2 mi E of Philipsburg, undergd,
MnO2, Ag, Zn, Pe, MnCO3
Prod: 130 tons
Mine Foreman: Thomas Purile Mine Foreman; Thomas Purtle 100-TON FLOT MILL 50-TON GRAV & MAGNETIC CONC Mill Foreman. Kenneth Bauer

AMERICAN SMELTING & REFINING CO JACK WAITE MINE, Senders Co, Pb, Zn (See Idaho) Mgr: JE Berg EAST HELENA PL, East Helens, Custom Lead Smelter
Mgr: Kuno Doerr, Jr
Supt: Joseph T Roy
(See Ariz, Colo, Calif, Ida, Ill, Nev,
Tex, New Mex, Utah, Wash & East)

ANACONDA ALUMINUM CO Columbia Falls Press: R P Caples VP: C H States Mgr: H G Satterthwaite Prod Supt: J F Smith Mech Supt: C J Landborg REDUC PL, 3 mi HE of Columbia

ANACONDA COPPER MNG CO

TRAVONA MINES, Butte dist, undergd, Cu, Zn, Mn Aset Gen Supt: Hale Strock Mine Supt, Leonard: Ruscell Powell Foreman, Tramway: William Trudeau Foreman, Travona. 8 Hurley Foreman, Emma: Wn Kerreuth BADGER, LEXINGTON & ALICE MINES, BADGER, LEXINOTON & ALICE MINES, Butte dist, undergit, Zn. Aset Gen Supt: Ed Bonner Foreman, Lexington: Ray Lahiff OREATER BUTTE FROJECT, KELLEY SHAFT, Butte dist, undergit, Ca. Aset Gen Supt: Martin Hannifan Aset Gen Supt: Martin Hannifan Aset Gen Supt: Milling Oper: Hale Struck
Mine Supt. John Killoy
Foreman, Kelley: Wan Creber
Ch Layout Engr: AD Rood
ANACONDA REDUCTION WORKS,
Anneonds.

Ch Layout Engr: A D Rood
ANACONDA REDUCTION WORKS,
Anaconda
Mgr: W E Mitchell
Asst Mgr: C A Lemmon
Gen Supi: A E Barnard
Research Engr: F F Frick
Research Engr: F L Holderreed
Testing Engr: T G Pulmor
Met: R O Bowman
Ch Chemist: C H Gutchell
Mech Supi: L E Larven
Elec Supi: R P McCarren
Supi, Const: B F Morris
Ch Draftsman: E P Dimock
Supi, Sing & Tings: J A Grant
Supi, Tram & Weigh: B E Westgaard
Supi, Burd Theyer
Asst Supi, Tram & Weigh: B E Westgaard
Supi, Bon Concent
A, 000-TON COPPER CONCEN,
4, 000-TON COPPER CONCEN,
4, 000-TON COPPER Supi: C F Milkwick
Asst Supis: F A Roeder, T J Fieher,
B T McDonald
COPPER SMELTER, 180, 000 tone
Par year
Supi: H J Maguire par year Supt: H J Maguire Asst Supt: J H McCres ELECTROLYTIC ZUNC PLANT,

ELECTROLYTIC ZHIC PLANT, 86,400 tome since per year Supt, Elec Zinc Pl: W A Emanuel Supt, Roseters: F A Salomonson Supt, Zinc Leaching Fl: C M Holstrom. Supt, Zinc Electrolyzing Pl: K O SWEEDRY SULPHURIC ACID PLANTS, 420 tons SULPHURIC ACID PLANTS, 420 tons 60° Be' acid per day Supt: M R Hoyt Acet Supt: W W Harrity TREBLE SUPERPHOS PHATE PLANT, 100,000 tons per year Acet Supts: K F Ruckwardt, O C Finkelaburg MANGANESE NODULIZING PLANT, 270 Lone tons nor day 370 Long tons per day Supt: F Cole

PERROMANGANERS PLANT, 8, 909
long tone per mornile
Supt: J B Movere
Asst Supt: E S Krarnilick
DART TREATING PLANT, 6,000 tone
white around per messith
Supt: J J Dougherty
GREAT PLALS RESPONTED WORKE,
Great Falle
Gen Supt: P S Weisner
Asst Gen Supt: T K Grahum
Treak Consult: E S Shardwell
Mech Supt: J W Partor
Met: R J Lapee
GR Clark: W P Shadden
FURNACE & BLEKTEGLYTE
COPPER REFINERIES, 180,000 &
180,000 sone per year
Supt: R H Ballor
Asst Supt: R H Ballor
Asst Supt: R H Ballor
Asst Supt: R H Ballor
Asst Supt: R H Ballor
Asst Supt: R H Ballor
Asst Supt: R H Ballor
FURNACE, 600 long tone per second
Supt: G W Wever
Asst Supt: R H Ballor
FURNACE, 600 long tone per second
Supt: R T Toumseed
EAST HELEFRA SLAG FUMBIG PL
250,000 sone per year
Supt: R H Ballor
Asst Supt: R H Ballor
Asst Supt: R H Ballor
Asst Supt: R H Ballor
Asst Supt: R H Ballor
Asst Supt: R H Ballor
Asst Supt: R H Ballor
Asst Supt: R Ballor
Asst Supt: R Ballor
Asst Supt: R L Thompson
Geo Calif, New, Saloko, Utab & Kesti

ANDERSON BROS
Levisions
RLUE DICK MIRK, Warm Aprings
Glos, Frages Co., Co.
Sinder dovel

Buperier
Spr: Karmit Blam
MINE, Coder & Trout Cr det,
Mineral Co, Ag. Co, Ph. Zo
Under devet

BAILEY, B L.
Underson

GOLD, SILVER, WAR, BLACK EAGLE,
HIDDEN TREASURE, CARRY QUARTZ.
LONES, LISHE Rocky Mas, 50 ms SW of
Dedoon, Au, Au, 6%

Under devel

BASIN JIB GOLD MINES, LNC 100 Adelaide St, West, Toronto, Canada Pres: D Domy BASIN MINE, Bosta, upon pet h undergé, Au, Ag, 79 Supt: M E Massey

BELLVUE MINH Cliston Opero: Terry & Bessell MINE, Cu, U

SER BARRISON MINES
Fony
MINE, 4 mi SW of Puny, Au

BEHNETT MIMING CO
BOX 1135, Great Falis
Free: Carroll & Bannati
Sec: F A Clarke
DACOTAN MIME, 1478 on N of
Neihart, undergé, Za, Ph. Ag, és
His
60-TON PLOT Midde, 1 on from

HIG BLUE MINE
Cores E W Wade & A J Madeen,
Cooke
MINE, New World dist, Purk Co,
Ag. Cu, Ph. Sa
Estio

Troy
Mgr: Ed McCaffory
MinE, 6 on from Troy, Es, Pb, Ag
Elle

BLACK & WHITE MING CO 33: N Ave W, Missoula Pro & Gon Mgr: Roger P Little BROOKLITE MINE, Maxville, 4 ml N of Philippelers, undergd & cortace Ag. To, Ec. Co

BLUE DOT MIN:NG CO Estion Incorptro: O Argorbright, M D Argorbright, Dillon; E T Blueshel Bisecula Under devel

BOSS-ATLANTIS MINES Opro: Glan Zoro, C E Vannew MINE, Cascade Co BULLWACKER MINE Helena Ope: Hormon Rogers Box 1710, Helena MINE, Summix Valley dist, Silver Bow Co, Ca

BULS MIBING CG
1001 E Brundeng, Missemin
Gen Mgr: CF Buls
Asst Mgr: Don Raistee
Sec: Win Buckley
BLACK TRAYERAL, 6 mt BE
of Saluse, undergé, Ag.Cu, Au
Under Seval

BURGESS, STARRETT J

d815 Highland St, Motona
CAPTOL MMINE, Argents dist,
Beaverhand Co, Ag, Cu, Pb, Zo

OVERLAND MINE, Montenan City
diot, Jefferson Co, Ag, Pb, Zo

SCRATCH GRAVEL MINE, Serwigh
Gravel dist, Lewis & Clark Co,
Au, Ag, Cu, Pb, Zo

Bill

BUTTE COPPER CONS MINES
505 Mostana Standard Bidg, Butte
Pres: C J Traserman
JO DANDY GROUP, Radersburg, Ag, Pb

BUTTE COPPER & ZINC CO
269 Lewicolm Bidg, Bette
EMMA MINE ORCUP, undergd, Mn,
Zn, Pb, Au, Ag
Engr: Sammel Barbarm, Je
(Operated by Anaconda Copper
Mng Co, eer Kasel)

CALEDONIA SILVER-LEAD MHG CO Lewistown DICKITE CLAY MINE Under devel

CANUSCO, INC

Hazon
Presi B H Pooley
VP: B C Demoster
Sec-Treas: E V Dempster
MINE, Stucon, Au, dragline dredge
Dupi: E P-Wollo
Lilie
CARBONATE MINE, Whitehall dist, Po
Opr: Lester Lindquist

CANYON LODE MNG CO
219 Radio Central Bidg, Missonia
Proc. B R Wallace
VP: Roy Wallace
Sea: Herbert C Fisher
Geol: Earl F Eistone
CABLE MINE, Anaconda, 19 mi NW
of Anaconda, undergd & placer, Au, Cu
109-TON FLOT MILL
Lilis

CASTLE LEAD & ZINC CO Lancep YELLOWSTONE MINE, Castle Mt dist, Meagher Co, Ag, Po, En Under devel

CHARTER OAK MING CO
Elliston
CHARTER OAK MINE, Elliston, 9
mil of Elliston, undergd, Pb, Ag, Au, 2s
Under devel
FLOT MILL.

COLORADO MINE

535 E Mercury St, Butte

Opr. Nick Vajovich

MINE, Summit Valley Dist, Ag

COLUMBIA MNG CO, INC
604 Piacer Hotel Bidg, Helena
Pres. Joses Majore
VP. E W O'Loughtia
Gen Mgr & Sec: C B Mitchell
COLUMBIA MINE, at seathern city
limits of Helena, undergd, Cu, Ag, Au
Mine Foreman: Leetle L Heuberg
Under Sevel

COMMONWEALTH LEAD MRG 484 Felt Bidg, Sait Lake City Utah Pros: JF Featherstone Sec-Tross: DR Featherstone CALVIN MINE, Melross, undergd, Au, Ag, Fo, Zn Bills

CONSOLATION MIRE Lincoln Opra: Earl Noces & Tilioton Bree MINE, Heddieston dist, Lewis & Clark Ca, Ag. Pa, Za Under devei CONTACT MINING CO
524 Washington St, Butte
Pros: Peter Antoniold, Sr
Gen Mgr: Feber Antoniold, Sr
Met: Frank M Actioniol SCRATCH ALL MINE, Philipshweg,
undergd, Ag, Zn, Mn, Peter
HGHLAND PHORMATE MEEE, Buire,
Smit S of Botte, undergd & surface,
plusphate
Master Arresi.

COPPER CARYON MING CO Incorpirs: Les Shook, Zella Shook & Ernest Shook, Hamilton

COPPEROPOLIS MINE
Opr: George Cormley & Sons
SOT S Main St, Butte
MINE, 18 and E of White Sulphor
Oper, Cu
Under devel

CORNUCOPIA MINES CO Bee 214, Virginia Caty Mgr: Heavy Shade MINE, Virginia City diet, Séadison Co, undergd, Au, Ag Mile

CORONADO COPPER &
ZINC CO
Butte Sixtrict
Eng in Chg: M G Grant
ELUE SIRD OROUP, Western Butte
dist
Idle
MINERAL KING MINE, 3 mi S of
Saltose, Ph. Zo, Ag
Under devel
WATER HOLE MINE, Sear Thompson
Falls
Under devel
(See Arth, Calif)

SILVER CRESCENT MNG CO BOX 195, Helica William A Hall VP: Hoory Edwards Sec: Laurel Roe CRESCENT, FIGERLESS & BILVER CRESCENT MINES, 23 mi S of Helens Au, Pb, Ag, Zn, Cu, Undergd

CRITCHFIELD, RATMOND
Box 333, Whitehall
PARROTT LEASE, 4 on NE of
Whitehall, undergé, Ng. Pb. Ag. Cu
Supt: Albert R Critchfield
IRONSIDE MINE, 4 mi NE of Whitehall,
undergé, Pb. Ag
Supt: A R Critchfield

CRUMB, RAY W
Avon
HUMDINGER MINE, 31 mm W of
Avon, undergd, Au, Ag
Under devet
4-TON GRAY MILL

CUMBERLAND MINES
White Sulphur Springs
Pres. Russell Manger
VP: Richard Manger
Mgr: C R Oliphant
CUMBERLAND MINE, 8 mi
from Lennep, Pb, Ag, Za
Lilie

DAILY WEST MINE
Basin
Opro: Geo Freyler & J M Gill
MINE, Cataract diet, Jefferson
Co, Ag, Cu, Pb, Za

DEER HORN MINE Heigns Opre: William & Tom O'Brien MINE, Wilson & Ticer Creeks (1888, Jefferson Co. Ag. Cu. Ph., Zn

DISCOVERY & UNCERTAIN MINES Canyon Creek Opr: Karl Kwany MINES, Canyon Creek dist, Lewis & Clark Co, Au, Ag

BIXON COPPER CO Roman Pres: Ed Brebnim Sec-Treas: R T Maxwell BLUE OX CLAIMS, 6 mi SE of Dixon, Au, Cu 1528

DOMESTIC MANGANESE & DEVEL CO Bon 177, Butte Pres: J H Cole VP: H A Pumpelly Sed-Treas: Cathrys C Helm Gen Supt; Carl Martin 305-TON FLOT MILL with nodulizing pl for rhodocroells, oxide

DOUBLE EAGLE TUNGSTEN
CO
Bear K. Philipphurg
Free & Gen Mgr: W R McLaye
VF: E T Levien
Sec-Trees: W L Degroinert
DOUBLE EAGLE MINE, IS and MW
of Philipphurg, W. Ca. Pa, dg
Shifthorac C D McLaye

Md.

EDNA #3 MINE
Winston
Opr: M L Miles
MINE, Beaver diet, Bresidenter
Co, Au, Ag, Cu, Pb

EDWARDS MINE
Manarch
Ope: Thousen & Brases
MINE, Barker dist, Judith Bagin
Co, Ag, Cu, Pb, Zn

ELDORADO MINING CO 304 Broadway, Helena Free: O W Politard ELDORADO MINE, 12 mi N of Avon, undergd, Ca, Au, Ag 30-TON FLOT MILL

ELKHORH MINING CO
Beulder Bank Bidg, Boulder
Pres & Gen Mgr. W V Lewis
VP: W S Doyle
Sec-Treas: J T Lewis
Office Mgr & Purch Agt: Perges
C Fay
ELMHORN, FREE ENTERPRES,
49er, & LAST CHANCE MINES,
underg & Po, Ag. Zn, Au, U Th & sure
earths, under devel
Fervensam: W B Smith
Engr: Wade V Lewis
CLANCY URANIUM MINE, 8 um &
of Clancy, undergd, U,
Prod: 5 tons
Under devel
Under devel

ELLISTON CONS MINING CO'
Elliston
Pres & Gon Mgr: L T Newman
VP: C L Sietgron
Sec: D E Newman
Treas: Victor Freet
Lilly. Suffer Thing, SULSA &
COPPER KING GROUPS, 10 mi S of
Elliston on Telegraph Creek, undergd,
Au, Ag. Pb, Zn, Cu
Under devel

EVERGREEN MINE
Opr: A T Cooper
Box 382, Helena
MINE, Rimini dist, Lewis & Clark
Co, Ag, Pb, Zo

F M S MINING CO Garnet Dire: Feedkiner, Ormesher & Sutherland, Missoula MITCHELL-MUSSIGHROD MENE & DUMPS, garmet, Au

FAITH MINING CO Mmarch FAITH GROUP, Barker dist, Judith Basin Co, Ag, Co, Pb, Za

PAITEFUL GOLD MNG CO DILLON Gen Mgr & Parch Agt. D V Erwin FAITHFUL GOLD, ALICE LEAD & BAGGER GOLD MINES, Dillon, Ag Au F.

FALK METALS CORP 210 Mercantile Bldg, Deever S BELLE CANYON MINE, Au, Ag

FERDINAND MINE Argenta Opes: R Nygren & E Dubie MINE, Argenta dist, Beaverheed Co, Ag, Cu, Po, Za

PINLEN & SHERIDAN MHG CO Box 302, Missowia Free; Jas T Finlen VP: L M Sheridan Gen Mgg: Jas P Murphy BARITA MINE, Greenough, 30 mi ME of Missowia, undergd & surface, bartte Mine Supt. Ernie LaFlam Prod: 100 tons ROLLER MILL, Bartte uppr Mill Supt. C C Cannon FLINT, JAMES A & SONS
Bank Bidg, Pony
LOUSIANA, CHILLE, AMY LOUSE,
& others, Madison Co, Au, Ag, WO₃,
Cu
Elle
TUNGSTEN GROUP, 12 mi 3 of Ppay,
undergd, surface WO₃
MINING STATES GROUP, WO₃

FLORENCE COMPANY cfe AD Reider, Big Fork Pres: AD Reider VP: Mary Reider Sec: C J Trauerman MINUTE MAN GROUP, 8 mi SE ef Neihart, Fb, Zn, Cu, Ag Lille

GALT MINR
Opr: Lewis B Stark, Neihart
MINE, Montana dist, Cascade Co,
Au, Ag, Cu, Pb, Zn

GARPIELD MINE Rimini Opr: WA Hall MINE, Rimini dist, Lewis & Clark Co, Au, Ag, Cu, Za

GARRISON MINING CO Virginia City Pres & Gen Mgr: Rupert Garrison See: Fred it Stewart GARRISON MINE, 8 mi 8 of Virginia City, undergd, As Under devel

QILDERSLEEVE BROS MINES
Superior
Gen Mgr: G M Gildersleeve
BONANZA GROUP QUARTZ &
STEMWINDER PLACER MINE,
IT mis of Superior, undergd & placer,
Fb, Ag, Cu, Au
Little

GINLIO, JOHN SILVER HILL MINE, Jefferson Co Lille

GOLCONDA MNG CO, INC 15 Pittsburg Bik, Helena Pres: M I Leydig Sec: C P Whitcomb BUCKEYE GROUP, 7 mi SE of Jefferson City, Au, Ag, Pb 100-TON CYAN COMC MILL

GOLD KING MINE Opr: Clarence Woody, Marville MINE, Boulder & S Boulder dist, Granite Co, Au, Ag, Cu

GOLDEN ANCHOR MNG & MLG
CO CONS, INC
1420 Old Nat'l Bank Bidg, Spokase,
Washington
Pree & Gen Mgr: H L Newmiller
VP: L A Mycon
Sec: Helen N Newmiller
BIG DICK, BLACKJACK & ASSOC PROP,
Box 535, Elliston, 10 mil \$ 4 E of Elliston,
Undergd, Pb, Ag, Au, Ze
Mine Supt; H L Newmiller
Foreman: Wm F Neumiller

GOPHER MINE
Opr: Arthur A Berg, Radersburg
MINE, Cedar Plaine dist, Broadwater
Co, Au, Ag, Cu, Pb, Zn

GOVERNOR TILDEN MINE Opr: Rudy Nygren, Dillon MINE, Argenta dist, Beaverhead Co, Au, Ag, Cu, Pb, Zn Under devel

GRANT-JOHNSON MINE 267 Second Ave, EN, Kalispell MINE, 30 mi W of Kalispell, undergd, Au, Ag, Cu Under daywi

GRAY JOCKEY MINE
Opr: Neil Churchill, Butte
MINE, Vipond dist, Beaverhead Co,
Ag, Cu

GREENSTONE COPPER MINE
Bux 421, DRIBBAN
Pres: G W Farlin
Sec-Treas: Grace E Kennedy
Gen Mgr. Carl Kennedy
GREENSTONE MINE, 18 mt NW of
Dillon, W. Cu, Ag, Cu (Open pit
operations leased to Minerals Engr
Co of Colo)
Idle
IVANHOE MINE, 30 mt NW of Dillon,
Undergd, W. Cu, Ag (Leased to
American Alloy Metals Co)

HAND, IDA B DRILLO HAND MIRNE, 13 mi W of Dillon, Au, Ag, Pb Frod: 25 tons Mine Foreman: John Hand Mine Engr: Bill Hand

H & S MINE
Opr: Frank Bjorni, Grant
MINE, Chinatown diet, Beaverhead
Co, Ag, Pb, Za
Ender devel

HARD LUCK MINE Opr: Ray Ward, Ellisten MINE, Nigger Hill dist, Powell Co, Ag, Pb, Zn Under devel

BARTLEY MINE
Opr: Wm Mahama, Meihart
MINE, Montana dist, Cascade Co,
Ag, Pb, Zn

HENDERSON TUNGSTEN CO
Drammond
Press: JD Drent
Sec: W A Noon
HENDERSON CR PLACER, Drummond, 20
mi S of Philipsburg, WO₂, Au
Under davel
50 TON GRAV MILL, magnetic separator,
libs

BI-ORE MINE Opr: Wm Hagman, Boulder MINE, Amason dist, Jefferson Co, Ag, Pb, Zn.

HI-RIDGE MINE
Twin Bridges
Owner: J C Roberts
MINE, 6 mi E of Twin Bridges, Au, Ag
Mgr: James P Reed
Like

HOKANSON BROS
BOX 34, Norris
Opre: A E & F W Hokanson
PEARL GROUP, 7 mi SW of Norris,
Au, Ag, FP, Undergd
Under devel
DEER PARK LEASE, Norris, 10 mi
SE of Toston, undergd, Fb

HUGHES CREEK MINE Opr: Asbury Smith, Hamilton MINE, Overwich dist, Ravalli Co, Au, Ag Under devel

HUNT MINING CO, INC
Box 65, Lauria
Pres: M Z Hunt
Gen Mgr: A E Hunt
BINS, GOLD NUGGET, BULL RUN &
CALIFORNIA GROUPS, Leuria, undergd,
surface & Placer, Au, Ag, Pb
Foreman: Toney Ravona
Mech Engr: Elbert Pack
GRAV-PLOT MILL, 25-ton fura
Foreman: Karl Caldwell

INSPIRATION LEAD CO
909 W Sprague, Spokame, Wash
Pres & Sec: EH Carlson
VF: C C Anderson
Gen Mgr: W T Anderson
Gen Sugt: R R Weideman
Ovenil W H Simmun
ORO MINE, Trey, I mi SW of Trey,
undergd & surface, Pb, Cu, Zn, Ag
Mine Suyt: A L Osborn
Under Savel

INTERNAT'L MAS &
CHEM CORP
Drymmond
PRIOSPRATE MINES & PLANT
(See Aris, Calif, Colo, New Men,
So Dak, Wyo, Central, South &
East)

INTERSTATE PRODUCTS CO Soveman MINE, sear Gallatin Gateway, asheston Pres: C A Lester Under devei

IRON MT LEASING CO Superior Mgr: EG Smith, Osbers, Idaho IRON MT MINE, Pb. Zm, Ag (Leased from Fed Ming & Smell Co, Idaho)

JACK GROUP MNG CO Dillion JACK GROUP MINE, Argenta diet, Beaverhead Co, Au, Ag, Pb, Zn JANUARY MINING CO 416 Flowerse St, Helena Pres: Geo G E Neil JAMUARY MINE, 6 mi S of Winston, undergd, Fb, Ag, Au Frod: 700 tons Mine Supt: Arthur Hogan (Leased to January Mines, e/o Ed Puhl, 105 Harvard N, Scattle, Wash)

JARDINE MINING CO Jardine
VP & Gen Mgr: G T Vandel
Purch Agi: E L Conn
MINE, Undergd & surface, Au, W
Supi: B F Onstott
Idle
350-TON CYAN FLOT MILL

JUPITER MINING CO
Day Bidg, Box 1010, Wallace
Pres: M L Day
Sec-Treas: R W Anno
MINE, near Saltese, undergd,
Pb. Ag. Cu

KLEINSCHMIDT MINB Opr: Cecil Johnson, Wineton MINE, Beaver dist, Broadwater Co, Ag, Cu, Pb, Zn Under devei

KOOTENAI MINING CO Libby Incorptre: R H McConnel & A E Nugent, Kellogg, Ida & J E Gyde, Wallace, Ida

LADY LEITH MINE
Opre: A Loiselle & M Young
Hazin
MINE, Cataract dist, Jefferson
Co, Ag, Pb, Zn

LAHEY LEASING CO 506 W Aluminum St, Butte Mgg: Ed Lahey ALTA MINE, Colorado dist, Jefferson Co, Au, Ag, Cu, Pb, Zn

LEHMAN, WALTER Box 780, Lewistown SIR WALTER SCOTT MINE, 70 mi W of Lewistown, undergd, Ag, Pb, Cu Under devel AMERICA MINE, 23 mi NE of Lewiston, undergd, Pb, Ag, Au Under devel

LEXINGTON SILVER-LEAD MINES, INC Neihart Pres: J A Allen BMG SEVEN MINE

LIBBY GOLD CORP
T45 Peyton Bidg, Spokane, Wash
Pres: JW Doughty
VP: S 3 Schuette
Sec-Treas: R P Woodworth
Mgr Dir: Barth Kenelty
LIBBY GOLD MINE, 6 mi from
Libby, Ag, Au, Pb

LIBERTY MONTANA
MINES CO
Jefferson Island
Pres: W D Corrigan, Sr
MAMMOTH MINE, Madison Co,
Au, Ag, Cu
Gen Mgr: A J MacGregor
150-TON FLOT MILL
Litie

LIVELY MINING CO Box 95, Melrose Gen Mgr. L B Lively HECLA MUNE, 16 mi W of Melrose, undergd, Ag. Pb. Cu. Au Mine Foreman: John Seyler

LUCKY BUD MINE
Opr: Al Kingery
MINE, Sheridan dist, Madison Co,
Ag, Cu, Pb, Zn

LUCKY HIT MINE
Whitehall
Owner: G W Wolfe
MINE, Jefferson Co, Cu, Pb, Zn

LUCKY LEAD MINES, INC 210 Radio Central Bidg, Missoula Pres à Cen Mgr: Earl T Ellis VP: C Gale Glesson Sec: Herbert C Pisher Met: Carl C Martin Geoi: Earl F Elstone NON PARIEL MINE, 7 1/3 mi SE of haxville, surface, Pb, Ag Mine Supt: Orville Lammers 90-TON GRAV-FLOT MILL, Boulder Creek Mill Supt: Ed Pierce

LUITON MINING CO Beauta Mgr & Incorptr: Thos J Luiten MINE, 4 mi N of Benita, Copper Cuiff dist, Pb Under devel

LUKE, RUSSELL B
1021 E Front St. Butte
JACK PINE PHOSPHATE MINE,
9 ml NE of Elliston, undergd,
Under devel
LUKE'S SILICA QUARRY, 6 mi W
of Anaconda, open pit
PINE SQUIREL TUNGSTEN MINE,
7 mi NE of Avon, undergd
Under devel

MADISONIAN MNG & MLG CO West Yellowstone Pres: C A Lester MNG & MLG CO, devel chrysotile asbestos prop at Cliff Lake

MANGER PAMILY
white Sulphur Springs
Owners: Richard, Wm & Clara Manger
CUMBERLAND OP, Castle Mt, Pb, Ag
SNOWBANK OP, 30 mi W of White
Sulphur Springs, As
GYPSUM DEPOSIT, 30 mi NW of
White Sulphur Springs

MARIE MINE
Opr: Jee Massa, Philipeburg
MINE, Flint Cr dist, Granite
Co, Ag, Po, Za
Litz

MARIETTA MINES
Box 20, Townsend
MINES, 17 mi NW of Townsend in
Park dist, Au, Ag, Pb, Zn
Mgr: Al Dance
Supt: Harry Anders
Under devel

MARTIN MINING CO Kalispell Pres: Hans Tutvedi VP: Ben Schlegel Sec-Treas: B T Flynn MINE, Flathead Co, undergd, Ag, Pb, Cu, Zn Supt: Waino Lindbom 60-TON MILL

MASTER MINING CO 6323 Avondale Ave, Chicago, Ill Pres: O.L Rhondea MINE, Gold Creek, Au, dragline Eredge Mgr: J H McIntosh

MAULDEN MINE
Dillon
Opr: Ida B Hand
MINE, Argenta dist, Beaverhead
Co, Pb, Ag

MAYWOOD, MRS G A
Box 45, Palm City, Calif
MONTANA-TONEPAH MINE,
5 mi E of Maxville, placer
Idle

METALS MILLING CO, INC Bakin Press B Linn -See: Will Derig Treas: Noy Brennon RED ROCK MINE, 5 mi # of Bakin, FD, Zn, Ag, Au Prod: 40 tone Mine Engr: John MacCinnius 139-TON CUSTOM FLOT MILL, Mine & Mill Supt: Frank Soil Met: Don Ober Else Engr: Pets Brady

MIDNITE & MORNING MINE Opre: D A DuBois & G C Holshue Basisis MINE, & om N of Basin, undergd, Pb, Zn, Au, Ag

MILLER, JACK, MINE Box 333, Drummond Gen Mgr: W A Noon MINE, Au, Ag, Pb

MINAN DEVELOP CO Butte Mgr: A E Nugent MATSON & MORTH ALTA GROUPS, Jefferson Co Ldle MINERAL KING MNG CO 1001 E Broadway, Missoula Pres: C F Bule Sec: C F Bule MINERAL KING MINE, 3 mi N of Salose, undergd 6 surface, Au, Ag, Pb, Zn, Cu Under devel (Leased to Cyprus Corp)

MINERALS ENG CO, MONTANA
TUNGSTEM DIV
BOS 94, Glan
LOST CR TUNGSTEM MINE, 7 mi W
of Glee, eurface, WO₃, Mo
Prod: 85 tons
Mine Supt: J C Turnehan
IVANHOE MINE, 13 mi MW of Glen,
surface, WO₃, Mo
Prod: 300 tons
Mine Supt: R N Roby
BROWNSI LAKE, Glen, undergd &
eurface, WO₃
Prod: 300 mm
Mine Supt: Win B Tobey
Mine Supt: Win B Tobey
Mine Forenum: Next Roby
300 TON GRAV-PLOT MILL, Glens
Mill Supt: Earl M Craig
(See Colo & Utah)

MINES PROSPECTING & EXPLOR CO 218-218 Radio Central Bldg, Minssonia Press: Earl F Eletone VP: R R Wallace Sect Herbert C Fisher EXPLOR, TESTING

MINERVA MINE
Whitehall
Opr: Charles O Weber
MINE, 7 mi NE of Whitehall,
undergd, Pb, Ag, Au, Zn
Under devei

MINNIE MINE
Opr: O A Krueger, Twin Bridges
MINE, Norris & Norwegian diet,
Madison Co, Au, Ag, Cu

MIRACLE MINES, INC Basin Pres: W.W. Durran VP: J. Maliane Gen Mgr. Alfred Hedval MERRY WIDOW, J. mi N of Basin

MISSOULA-LINCOLN
METALS CO
501 Montana Ave, Missoula
DOLLAR, HALF DOLLAR &
BLUEDIRD MINES, Lincoln dist,
Lewis & Clark Co

MITCHELL MNG CO
312 Union Block, Mt Vernen,
Wash

Pres & Gen Mgr: E B Olmetead
VP: L M Peck
Sec: Waiter Hartwick
Treas: A E Pelland
MARGET MINE, 2 mi N of Butte,
shaft, Ag, Mn, Au, Zn, Pb
Supt: Mawrice Turner
Geof & Engr: Roy Hammond

MO, HANS
RIGHES
REGION
RESPONSE
RESPONS

*MONANCH MINING CO Box 35, Melena Pres & Gen Mgr: D L (Cassy) Jones Sec: M E Gaw MOHARCH MINE, 14 mi S of Ellisten, undergd, Cu, Ps, Au, Ag Under devei

MONTANA COBALT & SILVER CREST CO Butte NEW SILVER CREST "A", Virginia City diot, Medison Co, Ag. Pb litte

MONTANA COPPER KING CO, INC Discor Incorptre: JEAGD Hall & JW Warren MONTANA MNG & ENGR CO Philipsbarg Press & Gool: F S Meal VF & Mett W. Logombart Sec: E T Irvine BAGDAD MINE, 28 mi NW of Philipsburg, undergd, Au, U Under devel

MONTANA PHOSPHATE
PROD
Carrison
Pres: R B Shelledy
ANDERSON MINE, H md NW of
Gartison
GRAVELEY, GIMLET & LUKE
MINES, 5 ml NW of Avon, Undergo
phosphate rock
Supt: F E Burnet
Acet Supt: A E Langaten
Poreman: C R McDonald
Engr: C Noon

MONTANA RAINBOW MNG CO Maryaville Owner: W R Wede Gen Supi: John Brophy DRUMLUMBON MNE, Maryaville, undergd, Au Elle

MOOSEHORN MNO CO Envide MINE, Vipond dist, Beaverhead Co, Au, Ag, Cu, Pb Lills

MORNING GLORY MINE Opr: JK Curties, Basin MINE, Cataract dist, Jefferson Co, Au, Ag, Cu, Pb, Zn

MOUNTAIN CLIFF MINE Opr: Fred Box, Pony MINE, Virginia City dist, Madison Co, Au, Ag, Pb, Za

MOUNTAIN PLOWER MINE Opre: R H & H P Rogers Virginia City MINE, Virginia City diet, Madison Co, Ag, Pb, Zn

MANCY LEE MINES, INC
410 Main St, Kellogg, Idaho
Gen Mgr: Frank Eichelberger
NANCY LEE GROUP, Superior,
undergd, Ag, PS, Za, CV
AMY, MATCHLESS & BOBBY
ANDERSON OROUPS, Pine Creek
dist, Kellogg, undergd, Au, Ag, Cu,
PP, Zn
Gen Supt: C R Ranney
RING & QUEEK MINUE
H35-TON FLOT MILL
Supt: Jacks Schroder

NEGROS MINE Elliston MINE, 6 mi 8 of Ellisten, undergd, Pb, Au, Ag Prod: 2 tone Mine Supt: John P Hopkins

NEW LENORE MNG CO Box E. Roman Pres: It E Oisson VP: A L Atkinson Sec. Prank E Hotsob NEW LENORE MINE, St Regis, 13 mt SW of St Regis, undergd, Mine Supt: Jack Sheldon Under street

MEWBERG BROS & SLOAM, INC Hasin EVA MAY MINE, Zn, Fb, Au, Ag Uobse devel

NEW WORLD MINE Opr: James T Rouane, Columbus MINE, New World diet, Park Co, Au, Ag, Cu, Pb, Zn Idlia

MINE MILE MINE
Ope: William Lamon, Stark (Spring
& Summer only)
MINE, Stark, 40 mt NW of Missouis,
undergd 6 ourface, Au, Ag
15 TON GRAY MILL
idle

MORTH STAR GROUP "A"
Ope: Boy E Nichols, Radersburg
MINES, Coder Plains dist,
Broadwater Co, Ag, Pb, Za

NORTHWEST GOLD CORP Whitehall COLORADO MINE, 4 mi S of Whitehall, Renova dist, Madison Co Edia MORWICH, PLUTO MINES
48 Hirbour Bidg, ButtePartners: I G Irving & R H
felson
MINES, 2 mi W of Bette, undergd,
Mn, Ag
Prod: 50 to 64 tens

OCCIDENTAL MINE Sheridan Opr: P il Peterson MINE, Sheridan dist, Madison Co, Ag, Cu, Pb, Za

OLD CHIEF MINE Opr. Jas Patton, Philipeburg MINE, Flint Cr dist, Granite Co, Ag. Pb, Za

OLIPHANT, CLARENCE Bays SUMBERLAND MINE (Leased from Cumberland Mines, which see)

ORO MINE
Opr: EG Philips, Troy
MINE, Ruby Cr diet, Lincoln
Co, Ag, Cu, Pb, Zn

OZANNE MINE Opre: L James & C Albano, Jens MINE, Dunkleberg dist, Granite Co, Au, Ag, Cu, Pb, Zn

PASSOVER MINE Oprs: Baird & Dawson, Boulder MINE, Elkhorn dist, Jefferson Co, Ag, Cu, Pb, Zn

PERHAPS MINE
Whitehall
Opr: Lester Lindquist
MINE, Jofferson Co., Au, Ag, Zn, Pb

PEURA, LOUIS

124 6th Ave, Heiena
GREGORY & MINNESOTA DUMP
BINNES, Coto diet, Jefferson Co,
Au, Ag, Cu, Fp, Zen
HELENA & BILVER COIN MINES,
Beratch Oravel dist, Lewis &
Clark Co, Au, Ag, Cu, Pp, Zen
HOPE & FAITH MINES, Montana
City dist, Jefferson Co, Au, Ag, Cu,
Pp, Zen
JULIA MINE, Scratch Oravel dist,
Lewis & Clark Co, Ag, Cu, Zen
Life
LIVER POOL DUMP, Clancy &
Lump Guich dist, Jefferson Co,
Ag, Cu, Fb, Zen
Ligit
WHITLATCH MINE, Helena
dist, Lewis & Clark Co, Au, Cu
Effe
WHITLATCH MINE, Helena dist,
Lewis & Clark Co, Au, Ag, Cu
MORNING STAR MINE, New World
dist, Park Co, Au, Ag, Cu
Folian Stark Co, Au, Ag, Cu
HORNING STAR MINE, New World
dist, Park Co, Au, Ag, Fereaco City
CLEVELAND MINE, Jefferson City

PHOSPHATE & MIN DEVEL Marxille Owners: Muri, Johnson & Ingersoll MINE, near Maxville, Granite Co

POTRATZ, G G Box 366, Avon CYCLONE MINE, 12 mi N of Avon, undergd, Cu, Ag, Au Lais

PONY TUNGSTEN ENTERPR Posty Pres: Emmett Clary VP: Fred D Box Gool: Goo S Gluck STRAWBERRY MINE, 11/2 mt W of Pony, undergd, WO3 Prod: 10 tons Mine Supi: Emmett Clary 50 TON GRAY MILL Mill Supi: Fred D Box

PRINCETON MNG CO Maxwille MINES, Boulder & B Boulder dist, Granite Co, Ag, Cu, Pb, Za Edir

RABBIT MINE Opr: Norman Rogers, Helena MINE, Summit Valley dist, Stiver Bow Co, Cu RADEN RESEARCH CORP
Boulder
Pres & Gen Mgr: Wade V Lewis
VP: Theodore Nyquest
Sec: JT Lewis
RED ROCK URANIUM MINE, Boulder,
2 mi W of Basin, undergd, U

RED CHIEF MINE Hirrin Opr: Chas White MINE, Norris & Norwegian dist, Madison Co, Ag.Cu Esle

REED, JIM Twin Bridges SHOEMAKER GROUP, 9 mi N of Twin Bridges, undergd, Au, Pb LEODORE & THISTLE MINES, Rochester dist, Madison Co, Ag, Cu, Pb, Zm

RELYEA PHOSPHATE MINE Box 85, Garrison Owner: Goo A Relyea MINE, Il mi N of Garrison, undergd, phosphate Prod. 100 tons Mine Supt: Goo A Relyea Mine Foreman: Wm Hendrickson

RENZ, HARRY
133 N Rife St, Dillon
PINE TREE MINE, Au, Ag

REVENUE MINES DEVEL CO Marris Pres & Mgr: R E Emry Pr: A H Emry Sec-Tress: A M Welles REVENUE GROUP, 7 mi SW of Norris, Au

RISING STAR MINE Opr: FC McNulty, Butte MINE, Summit Valley dist, Silver Bow Co, Ag, Pb, Zn

RISING SUN MNG CO Butts Incorptra: Al & Marie Pisher & Ernest Shepherd, Butte, & Dorothy Benson & G P Scheihing, Billings MINE, SW Butte dist

ROCK CREEK TUNGSTEN CO Misspain Incorptre: JP Smith, Owen Olmstad, BG Anderson, RT Stigner, Missoula, & Ed Schrieber, St John, Wash Under devel

ROYAL MINE Opr: EC Lucier, Drummond MINE, Dunkteberg dist, Grante Co, Ag. Pb, Zn MINE

BUBY GULCH MNG CO
Estiman
VP: G Donaldson
Sec-Treas: M W Engle
Gen Mgr: E A Schola
RUBY GULCH MNE, surface, Au, Ag
Mgr: P B Bryant
Engr: Hans Schroeder
300-TON CYAN PL
Supt: Max Klimper

SHAFER & RENZ / Argenta LAST CHANCE MINE, Argenta dist, undergd, Au

SIERRA TALC & CLAY CO 500 Randolph St, Los Angeles, Calif Pres: Dorothy Dodds Gen Mgr: E W Stevens YELLCWSTONE MINE, Ennis, 52 eni N of W Yellowstons, undergd, Nair.

SILVER BULLION MINES CO Waite Sulphur Springs MINE, Meagher Co, Ag

SILYER DYKE MINE
Opr: Paul Vdovec, Neihart
MINE, Montana dist, Cascade Co,
Ag, Cu, Pb, Za

SNOWPLAKE MINE Opr: Wm L Russell, Helmville MiNE, Big Blackfoot dist, Powell Co, Au, Pb, Zn Under devel SOLUBLE PROSPHATES, LTD Box 8, Maxville Pres: Lee H Skeels PMOS PHATE MINE, Maxville 59-TON MILL

RPAULDING MINES, INC Poplar Pres: B W Andresen VP: Lorents Holum Sec-Treas: Thelma Andresen MINE, Poplar, placer Under devei

STAR MINE & MILL Neihart Gen Mgr: LB Stark STAR & GALT MINES, N of Neihart, underge, Ag. Pb. Zn 10-TON PLOT BUILL

SWANSEA MINES, INC
Box 204, Halma
Pros & Gen Mgr: C L Hewitt
SILVER BELL MINE, 40 mi NW
of Helens, undergd, Au, Ag, Cu, Fo
Supt: Owcar Pullmer
Under devel

SYLVAN GOLD MINES, INC Basin Dirs: PV Phippe, H Phippe, A J Cavere, O A Bittrick, H O Bittrick FREEBURG GROUP, Jefferson Co, Au, Ag, Cu, Pb Lills

SYLVIA MINES
(A Partnership)
Box 331, Dillon
Mgr & Purch Agt: G M Fleming
SYLVIA MINE at Argenta, undergs,
Au, Ag, Po
Mine Supt: R M Fleming

TAYLOR-KNAPP CO
BOX FF, Philipsburg
Pres: S R Knapp
Pres: S R Knapp
VP & Gen Mgr: A V Taylor, Jy
VP: Alf C Kremer
Mgr: Donald S Johnson
Ch Engr: Charles P Knaebel
MOORLIGHT GROUP, Philipsburg,
undergd, Mn, Ag, Ze
Mine Foremani C H Reistud
Mill Foremani C H Reistud
Mill Foreman G Kneele
Assay: F & Neal
190-TON GRAV-MAG MILL

TIGER MINE
Opr: Croff & Montague, Monarch
MINE, Barber dist, Judith Basin
Co, Ag, Cu, Pb, Zm

TRADER BORN MNG CQ Dillon MINE, Virginia City dist, Madison Co, Ag, Pb, Za

TREASURE STATE MINE Opr: Wm Hagman, Boulder MINE, Amazon dist, Jefferson Co, Ag, Pb, Za

TRADER HORN MNG CO Dillon MINE, Virginia City dist, Madison Co, Ag. Pb. Ze

TREASURE STATE MINE Opr: Wm Hagman, Boulder MINE, Amazon diet, Jefferson Co, Ag, Pb, Zn

TRI-STATE MINERALS CO 2001 Lincola, Ogdes, Utah Owner: W K Skeoch Gen Mgr: John Pynor SMITH-DILLON MINE, Box 227, Dillon, surface, tale Mine Supt: Ernie Nigren

TUNGSTEN MINERALS, INC Billos Incorpire: Alian Pierce, R F Fleming & Al & Catherine Groshesu

UNITED MINES CO Bom FIT, Butts Pres: LR Dichason VP: NZ Walher Gen Mgr: C Owen Smither Sec: W C Walker Geol: Charles M Massey TROUMALDNE & OTHER MINES, 15 mi HE of Boulder, Au, Ag Under devel

U S GOLD CORP 403 Cedar St, Seattle, Wash VP & Gen Mgr: A Pat Clark MINE, 13 mi NE of Twin Bridges, Madison Co, Under devel B a H MINE, Tidal Wave dist, Madison Co, Au, Ag, Cu

U S MINING CORP
Beihart
BROADWATER & MOULTON GROUP,
Montana dist, Cascade Co, Ag, Cu
Pb. Za.

U S GYPSUM CO Heath. UNDERGROUND GYPSUM MINE Frod. 358 tons (Sec Calif. Colo, Ili, Mich, Nev, Tex, Utah, Wash, South & East)

U S STEEL CO Darby CRYSTAL MT MINE, CaP₂ (See Utah, Mich, Minn, South & East)

VERMICULITE CO OF AMERICA 406 Thorpe Bldg, Minneapolis, Minn Pres: Stanley Gray MINE near Hamilton, vermiculi

VICTOR CHEMICAL WORKS
Supt, Mont Oper: C G Derick
Prod Supt: C Hendrickson
Supt, Mng Oper: Henry Johnson
MINE, Maiden Rock, undergd,
phosphate rock
ELEMENTAL PHOSPHORUS PL,
Silver Bow, Electric Purnacing

VICTORIA MINES, INC
Box 247, Sheridan
Pres: John T Potts
AMERICAN PIT MINE, 2 mi W
of Silver Star, Łe, Zn, Au, Ag
TOLEDO-BUCKEYE GROUP,
Sheridan dist, Madison Co,
Ag, Cu, Pb, Zn
150-TON FLOT MILL

WASHINGTON MINE
Opr: Grant W Berggren
Hamilton
MINE, Overwich dist, Ravalli Co,

Au
WEST MONTANA EXPLOR &
DEVEL CO
411 Western Bank Bidg, Missoula
Pres & Gen Mgr: Roy W Key
VP: O J Durand

Pree & Gen Mgr: Roy W Key VP: O J Durand See: Francis A Hancock WASA-SHAMROCK MINE, 12 mi SE of Hall, undergd, open pit, Zn, Cu, Fb, Cd, WO₃, Mn Mine Engr: FA Hancock 500 COMB HEAV MED-FLOT MILL

WHITE PINE LEAD CO
Helenn
WHITE PINE MINE, Warm Springs
dist, Jefferson Co, Ag, Pb, Zn

WILLIAMS PROSPHATE CORP Canyon Camp Pres: Griff Williams MINE, 30 ml S of Alder, Madison Co, Phosphate

WYOMING - MONTANA MNG
& ENGR CO
Powell, Wyoming
Pres: Sam Egbert
VP: William Mauch
Bec: Marike Barchart
Blill BENETT MINE, Sheridan,
8 mi N of Sheridan, undergd, Fb,
Ag, Au
Mine Foreman: Jack Gldham
LATEST OUT MINE, 8 mi E of
Sheridan, undergd, Au, Ag, Pb, Cu

YOGO SAPPHIRE MNG CORP Lewistown PLACER, 50 mi SW of Lewistown

ZONOLITE CO Libby VP, Chg Prod: JB Myore Purch Agt: B J Dorrington Mgr: R A Bleich MUNE, near Libby, surface, hermiculite concentrate 1, 200-700 MILL (See South & III)

NEVADA

ADAVEN MNG CORP, LESSEE
Box 278, Pernley
WHITE BLOWOUT MINE, Washoe Co
Under deval

ADOOR, GEORGE T & YON PETERSON MNG CO Box 811, Ruth ELK LODE, Robinson dist, Zn, Pb, Au, Ag, Cu

AFFRANCHINO, ERNEST

Box 101. Eureka
REX MINE, Diamond dist, 18 mi NE
of Eureka, Pp., Ag
ESIS
EFFFERSON & STAR OF THE WEST
MINES, on Ruby Hill, 2 mi W of
Eureka, Shaie & Quartsite
ISIS
NEW RUBY BELL, 4 mi S of
Eureka, Ag, Pp. Au
HISSI AMBASSADOR & BROMIDE
MINES, 10 mi S of Eureka, Underground, Ag, Fp., Au
STIBNITE MINE, 7 mi S of Eureka,
undergd, 5b, Ag, Fp.
JEWEL MINE, 3 mi S of Eureka,
Au, Ag
Under devel

AMERICAN ORE CO
Box 578, Lovelock
AMERICAN IRON ORE MINE,
Perships Co.

AMERICAN PERLITE CO
Box 206, Fontana, Calif
Gen Mgr: C U Rechetcher
PERLITE QUEEN MINE, 12 mi SW
of Searchlight, surface, perlite
Prod: 100 tone
Mine Supt: Melvin F Spactha
Asst Supt: Carl C Movelin
100 TON GRAV MILL.

ANACONDA COPPER MNG CO YERINGTON PROJECT BOX 1000, Weed Heights Gen Mgr: A E Miller Mine Supt: H R Burch pl Supt: A J Gould Gen Mine Foreman: C J Houck Gen Pi Supt: F M Monninger Ch Clerk: H L Chesarek Pers Super: K W Humphreys Storekesper: R K Owen Master Mech: J J Hyland Gar Foreman: W M Cross Elec Foreman: M H Bissett YERINGTON MINE, 81 mi SE of Reno, surface, Cu Prod: II, 000 tons II, 000 tons II, 000 Tons LEACH & PRECIP PL (See Calif, Mont, Ida, Utah, East)

ARGENTA CONS MNG CO
Box 7, Goodsprings
ARGENTA MINE, 3 mi 5 of
Goodsprings, undergd & surface, Za, Pb
10-TON FLOT-CONCEN MILL
15te
65e-CAID

ARGENTUM MNG CO OF NEV
BOX 134, Mins
Pres & Gen Mgr: E S Gaise
VF: C E Earl
Met: A Kaatari
Sec: John A Crowther
Gen Supt: E S R Packer
NORTHERN BELLE LODE,
Candelari, undergd & surface, Ag,
Au, Fb, Za
Prod: 100 tons
LUCKY HILL, HOLMES & MT DIABLO
MINES, Candelari
100-TON FLOT-GRAV MILL, Columbus

ARISTA GOLD MNG CO Branty Mgr: W H Califort ARISTA MINE, 10 mi S of Beatty, undergs, Au, W Under devel

ATLAS GOLD MNG CO 830 Oliver St, S Pasadens, Calif c/o Nevada Corp, Service, Reno Pres à Gen Mgr: R H Carpenter VP: ER Carpenter Sec: Frank D Bland EDGEMONT MINES, Edgement vi Tuscarora, 85 mi N of Eiko, undergd, Au, Pb, Ag Under devei 80-TON FLOT-GRAV MILL

AUSTIN, JESSE
Jungo
NORTH STAR (JUNGO STAR) LODE,
Antelope dist, Au, Ag, Pb, Zn, Cu
Idle

BALTIMORE CAMAS MINES,
INC

Box 418, Ely
Pres: G P Williams
VP: C E Carver
See: E P McDonald
Gen Mgr: Lauren Smith
Met: George Bush
Geol: S L Blde
SCHAEPER, TICUP MINES,
Cherry Cr., 50 mi N of Ely,
undergd, W
Frod: 83-160 tons
Mine Supit Blaine Steele
Mine Engr: D E Anderson
100-TON PLOT-GRAV MILL,
magnetic separation
Mill Supit George Bush
Mill Foreman: LaVaive Davie
Gines Idanol
Mill Supit George Bush

BARIUM PRODUCTS, LTD
A SUBSID OF FOOD MACH &
CHEM CORP
BEILE MULLIAIN
Gen Mgr: G M Stark
MT SPRINGS MINE, 23 ml S of
Battle Mt, surface, barite
Mine Suyl: James Jury
(See Barium Producte, Calif,
Intermountain Chem, Wyo; Food
Mach & Chem, East)

BARNDT, V J Tybo vis Tonopah RESCUE LODE, Tybo dist, Pb, Au, Ag, Cu, Zn

BARYTE NO 1 MINE
Box 387, Battle Mountain
MINE, 16 mi from Battle Mt,
surface, barite
Mgr: Andrew J Shelton

BASIC REPRACTORIES, INC
STABLES
Magr. Oper: M Muller
Works Magr: H P Willard
Works Engr: David L Wooster
CABISS MINE, surface, magnesite,
brucite
Mine Supt: A M Dixon
MILL
Mill Supt: P W Memal
(See Central)

BATTLE CREEK TUNGSTEM Ruby Valley TUNGSTEN MIME, 57 mi SW of Welle, surface, scheelite Under devel

BAY STATE MINES
Kimberly
Lesses: A R Laird & J T Stinnett
MINE, 20 mi & of Eureks,
undergd, scheelite
Prod: 10 tons

BELMONT MINE & MILL CO ofo D A Jennings, Box 442, Ely BELMONT MINE, 54 mi 8E of Ely, undergd, Pp. Ag Under devel

BEOWAWE BARIUM PROD ASSN
Beowawe
Pres: Carl Hancaman
VP: Joe Thomas
Sec: C F Stone
Gen Mgr: Dick Edgar
Asst Gen Mgr: Cena Harris
Met: Lee Lakin
Mech Engr: L L Mauldin
Purch Agt: C F Stone
FIVE PITS, 33 mi S of Beowawe,
ourface, crude bartie
(Leaset to Magnet Cove Barium Co)

BIEROTH, H C
Mountain City
RIO TINTO DUMP, Mt City (Cope)
dist, Cu, Ag

BIG CASINO MINE Searchlight MINE, 3 mi E of Soarchlight, lode, Pb, Ag, Au, Zu idle BIG CREEK MNG & MLG CO Box 502, Assetts Free: Erate W Thompson Gen Mgr: Thee E Stevens BRY CANYON & BIG EREEK MINER, 18 mt 82 of Austin, undergd, surface, 5b Frod. 25 Lone Mine Supt: 18 A Clements— 25-TOM PLOT MILL, Assetin

BIO THREE MNO CO c/o R W DeLaMare & K D Thomes Silver City SPRIBIO VALLEY LODE, Sliver City dist, Ao, Ag

BLACK DIAMOND MINE Owner: Charleston Hill Nat'l Mines Contractor: Harry Raynor MINE, Humboldt Co, Ma

BLACK METAL MNG CO Flocks BLACK METAL LODE, Jack Robbit diot, Fb, Za, Ag, Cu, Au, Ma

BLACK PRINCE MNG CO Moche Proc: Mrs C B Whoeler Sec-Treas: E J Deck MiNE, Ploche, Mn, Au, Ag (Leased to Comb Metals Reduc)

BLACK ROCK-MANGANESE CO Ellor MINE, 51 mt SE of Battle Mt, undergd & eurface, Mn Prost: 103 Stors Mine Foreman: Ervih Walters

BLACK BOCK MNG CORP
137 Clarke St, Bishop, Calif
Prest K CLI
VP: Carl M Dice
Gen Mgr: Geo Reed
Mot: Phillip McGuire
Master Mech: C w Wilson
Sec. J H Hirst
Gen Supt: J C Perkins
Geol: Armand Santoire
LinCOLM MINE, Tempiste, 80 and
w of Caliente, undergd, scheelite,
Froi: 180 Rom
Mine Supt: Robt C Kirchman
Mine Foreman: John Simpson
Mine Supt: Robt C Kirchman
Mine Foreman: John Simpson
Mine Supt: Robt C Kirchman
Mine Foreman: John Simpson
Mine Supt: Robt C Kirchman
Mine Foreman: John Simpson
Mine Supt: Robt C Kirchman
Mine Foreman: John Simpson
Mine Supt: Robt C Kirchman
Mine Foreman: John Simpson
Mine Supt: Robt C Kirchman
Mine Foreman: John Simpson
Mine Supt: Robt C Kirchman
Mine Foreman: John Simpson
Mine Supt: Robt C Kirchman
Mine Foreman: John Simpson
Mine Supt: Robt C Kirchman
Mine Foreman: John Simpson
Mine Supt: Robt C Kirchman
Mine Foreman: John Simpson
Mine Supt: Robt C Kirchman
Mine Foreman: John Simpson
Mine Supt: Robt C Kirchman
Mine Foreman: John Simpson
Mine Supt: Robt C Kirchman
Mine Foreman
Mine Foreman
Mine Supt: Robt C Kirchman
Mine Foreman
Mine Foreman
Mine Supt: Robt C Kirchman
Mine Foreman
Mine Fore

SLACK ROCK SOIL AID CO Sulphur MINE, Sulphur, 58 ms W of Winnemuce \$00-TON MILL, crushing & screening

BLUE DIA MOND CORP
1850 S Alameds St. Los Angeles,
Calif
Free: N J Redmond
VP; W O Brhaley
Ch Chem: John Herbert:
Pi Engr: R S White
Safety Engr: C W Thempson
Purch Agt. B M Marts
BLUE DIAMOND MINE, Blue Diamond,
25 mi SW of Les Vegas, undergd,
dypeum
Frost: 800 toms
Mine Supt. M C Brooks
Asst Mine Supt. M C Cain
BSG-TOR MILL & PLANT
Mill Bugt. J P Dempsey
Who Mgr: H L Waldthausen, Jr

BLUE JACKET MNG CO
Box 2814, Boixe, Idaho
Pree: Leon K Carson
Seo: Jack Murdoch
MNFE, So ma N of Eiko, New
Under devei

BRISTOL SILVER MINES CO
318 Pett Bldg, Sait Labe City, Unh
Pros: C W Snyder
VPI. E M Snyder
Sec-Treas: C M Christenson
Purch Agt: E G Back
MINE, Bristol City, 25 ml N of
Picche, undergd, Pb, Cu, Za, Ag, Mn, Au
Gen Mgr; J H Buehler
Supt: D E Hyde

BRUHI ENTER PRISES

«fo E R Nines, Box 569, Tenopsh
SANGER, McNAMARA, COYOTE,
GEN THOMAS TLOS, Silver Peak dist,
Ag, Pb, Au, Cu
NEW YORK-EVA LODE, Montesuma
dist, Ag, Pb, Au, Cu
Timber deves!

BULLOCK, FRANK
34 S Grant St, Midvale
JACKSON LODE, Tecoma dist,
Pb, Ag, Cu, Au

BURCH, L P & L D LASHBY Ensignie vis Fallon GOLD LEBGE GROUP, Ensignie diet, Au, Ag Gwnor: Frank Schweiss Estate

C & C TURGSTEN CORP 248 University Terrace, Reno LINKA MINE, 20 m is of Austin, underge, scheelite Under devel by Uranium Mines of Amer, 307 Darting Bidg, Sait Lake City, Utah)

CABANNE, EMILE &
JIMMIE MORE
BOX 37, Sparks
BASE LODE, Av. Ag
CABIN 42 LODE, Av. Ag,
Idie
HUTCHISON LODE, Av. Ag, Olinghouse
six1

CALDER, DR WALLACE Box 339, Lovelock WADLEY MINIS, 15 ms SE of mill City, placer & undergd, dragline-dredge, Au, Ag

CAL-ALTA OIL & MNG CO, INC Lovelock Pres & Gen Mgr: Wm N Maharoff VP: J Van Bussell Asst Gen Mgr: John Papove See: Jes Cook Gen Supt: Earl L Tucker GOLDEN HORSESHOE MINE, 30 mi N of Lovelock, undergd, As, Ag 39-TON GRAY MILE.

CALLAHAH ZINC LEAD CO ELY VALLEY MILL, 1 mi E of Fronts 230-TON FLOY Gen Supt: L E Devis Supt: E Lowman Forceman: V W Washburn Line (See Alasia, Colo, Ney & East)

CASTLE MT MNG CO
slo J H Alleman,
Box 1229, Salt Lake City, Utah
Pres. R I Merrill
VP: B F Robbins
Soc-Treas: J H Alleman
CASTLE MT MINE, Lander Co,
undergd, Pb. Ag, Zn, Au, Cu
alia

CAVE TUNNEL LEASE ofo AR Hider, Box 186 Eastle Mountain BRON CANYON LODE, Battle Mt dist, Pb, Zn, Ag, Cu, Au Lille

CEDAR CHEST MINE Mina Owners: G A Peterson & John Dewar, Box 220, Mina Lesee: Kenneth Dunnham, Mina MINE, 22 mi E of bina, undergd, W Frod: E time

CENTRAL COMSTOCK MINES
CORF
422 Gasette Bidg, Reno
Pres: H B Cheeshor, Sr
VP & Met! H L Hasen
See: J E Cheesher
Engr: H B Cheesher, Jr
CONS CHOLLAR, POTOSI, HALE,
MORCROSS MINES, Vrginia City, 1/8
mi S & SE of Vieginia City, undergd &
surface, Au, Ag
Mine Supt: H B Chessher, Jr
Ells
300-TON CYAN MILL, Virginia City
Mill Supt: H L Hasen
Assay: Archie McFarland

CHANCE MINE Cherry Crock MINE, undergd, WO₃ Idia (Lessed to John Boundy)

CHARLESTON HILL MAT'L MINES CO 330 E 3rd, Winnemucca Pres: Mrs Mary Clough VP: C O Brailey Sec-Treas: L B Grants BLACK DIABLO MINE, Box 174, Coleonda, 21 mi S of Goleonda, undergd, MinOg CHERRY CREEK.
TUNGSTEN MNG
Box 2, Cherry Creek
Pres & Mgr. Kenneth Cleghorn
Sec-Trees: Willard Cleghorn
MINE, Cherry Creek, WO3

CHICK BED CO Fernley CHICK BED MINE, 22 mt E of Fernley, surface, distomaceous warth Supri: Lowell Smith

CHIMNEY MINES
Box 516, Lovelock
Owner: Elmo G Burgese
CHIMNEY MINE, 35 mi HW of
Lovelock, undergd,
5-TON CYAN MILL

CLEVE CR MINES, INC
218 Foit Bidg, Sait Lake City, Utah
Pres: L K Requa
VP: W J Frankin
Sec: Frances B Requa
KOLCHEK TUNGSTEM MINE, 17 mi
N of Major's Station, Waite Pine Ce,
undergd, WO₃, Au, Ag
file

CLIPPORD, JOSEPH & SONS BOX 848, Tonopah MORSSHOE LODE, Oak Springs dist, An, Ag TERRY-COUGAR (CLIPPORD) LODE, Clifford dist, Ag, Au

COLUMBIA MINE
Box 1285, Ely
Gen Mgr: Sam M Robsoon
MINES, i mt E of Ruth, undergd,
Mn, Zn, Ph, Cu, Au, Ag
Prod: 10 tons
GRAV MLLL, under constr

COMB GROUP LODE MINES Goodsprings Oprs: O F & Milton T Schwarts COMBINATION GROUP, Yellow Fine dist, lode, Fb, Zn, Ag, Au

COMBINED METALS
REDUCTION CO,
NEVADA OPERATIONS
Piuche
Mgr. Sam S Arents
Gen Mine Supt: Paul Germill
Gen Mill Supt: W G Prider
Gen Mine Supt: R G Lee
Cffice Mgr. F H Anderson
Mng Engr. R H Oedbe
CASELTON MINE, 3 mt W of
Ploche, undergel, Zn. Pb, Ag, Mn
Prod: 1,000 uons
Supt: R R Durk
Foreman: John J Russell
COMET MINE, 30 mt W of Ploche,
undergel, Zn. Pb, Ag, WO
Foreman: James Huise
Linder devel
MINERYA MINE, 75 mt N of Ploche,
undergel, WO,
Supt: Robert Stopper
Under devel
MINERYA MINE, 75 mt N of Ploche,
undergel, WO,
Supt: Robert Stopper
Under devel
TOB-TON CASELTON MILL, PLOTMS, Zn. Pb, Ag, Mn
Mill Supt: W G Fidler
Aust Mill Supt: C H Likene
400-TON PANACALITE MILL,
crushing & grinding, crude perlite
Mill Foreman: Otto Jones
Wise User User Super
COMMODORE TUNGSTEN MINES
Mgr: Gordon Smith, Gabbs
NEW YEAR MINE, Nye Co, WO3
(Oper Inca Devel Co)

CONCHER, LOUIS, JR
Box 101, Eiko
NEVER SWEAT MINE, 10 mi E
of Mountain City, undergd, Au, Ag,
Pb, Ze, Cu

CONQUEST MINE
c/o Cale Peer, Austin
MINE, 20 mi E of Austin, underground, curface, WO₃
Prod: 5 tons
Foreman: W E Ma-lon

CONSTANT, BENJAMIN BOX 1607, Reno GALENA MILL MUNE, 15 cmi S of Beno, undergd, Pb, Ag, An Frod: 20 lons 30 TON GRAY MILL, 45 cmi N of Leveluck CONSTANT MINERALS SEP PROCESS, INC Box 1807, Reno Pres & Gen Mgr: Maurice Constant VP: H C Howell Sec-Tress: Mary Smith MONKOTA MINE, 6 mi S of Salphar, surface, Se, Woy, Hg, Au, Ga Supt: B I Constant GRAV MTLL, 150 yes per hour GALENA HILL, lode, Ph, Ag, Cu, Ma

COOLEY MINING CO
Box 272, Austin
Pres: A J Cooley
THOMAS W MINE, New Pass diet,
lode, Au, Ag

COPPER BUTTE MNG CO, INC Box 6, Wabuska * BUCKSKIN (COPPER BUTTE) LGDE, Buckskin dist, An, Ag, Cu Under devei

COPPER CANYON MNG CO
Buttle Mountain
Press: Arthur A Raring
VP & Gen Mgr: R H Raring
Ch of Bet. L E Whicher
Sec: S L Sherman
COPPER CANYON MINE, 18 mi SW
of Battle Mt, undergd, Fe, Ag
Mine Engr: G T Brown
Life
350-TON PLOT MILL
Mill Supt: Raiph Hayden
Assayer: Eric Sondermann

COPPER KING CO
Battle Min
COPPER KING MINE, Maggie
Gr dist, lode, Cu, Ag, Au
fdle

COPPER VALLEY MINE
Agt: WA DeWitt, 937 2nd Ava,
Sait Lake City, Utah
MINE, 94 mi NE of Ety, undergel, Cu

COPPER PRODUCERS, ING DUNLAP MINE, Silver Star dist, lode, Cu, Ag, Au

CORDERO MINING CO
131 University Ave, Palo Alto, Calif
CORDERO MINE, McDermitt, 18 mi
8W of McDermitt, undergd, Hg
Frod: 40 tons
Gen Supt; Verne P Haas
Mine Foreman. Kenneth Reed
FURNACE at mine
(See Calif & Oregon)

CORDES, SILAS 924 Main St, Boine, Idaho BLUE JACKET MINE, Edgement dist, lode, Ag, Au, Cu, Pb, Za Under devel

CORNELIUS, LEE
Mina
Owners: Leland, Casey & Sullivaa
JASPER MINE, Mineral Ca, Ag, Cu
Lilie

COULTER, W 5
Battle Min
COPPER QUEEN MINE, Lander
Co., Au, Cu
DEAN MINE, Lander Co., Ag. Pb

CRAPTS & PETERSON
Hinckney, Utah
LEAD KING MINE, White Pine Co,
Ag, Pb, Za
Under devel

CRESCENT LEAD MNG CO Box 187, Searchlight MINE, Cu, Pb, Ag, Au Under devel

CONS COPPER MINES CORP Kimberly NEVADA OPERATIONS, surface, Cu, Au, Ag Gen Mgr: A JO'Conner Ch Engr: H W Bishop Ch Cik: John Eaby Masi Mechi. Thomas Glimeer Ch Gol: J Frank Sharp Ch Elec: M Wm Shields Ch Chem: L Mathle (See East)

CONS EUREKA MNG CO Enrela Gen Mgr: Sherman B Hinckley Asst Gen Mgr: Roger M Caywood MiNES, 3 mi from Eareka, undergd, Au, Pb Under devel (See Utab) CROWBLL, JIRVING JR Box 56, Beatty MINE, 5 mi E of Beatty, undergd, CaFg Prod: 38-56 toom skipping grade

CURIEUX & BATEMAN
Ros 642, Tomonh
Owners: Lena & Eleanor Bateman,
Jennie A Curieux
THE CATLIN MINE, Kawich Range,
50 mi SE of Tomopah, undergd, Au, Ag

CUSHMAW, JAMES A Silver City VALLEY VIEW GROUP, Silver City dist, lode, Au, Ag

DAKIN, FRED H

2811 Hilloide Dr., Burlingame, Calif
CENVANTITE MINE, 23 mi E of
Lovelock, undergd, Sb
Umder devel

DAVIS, DONALD Box 361, Lovelock BLUE SKY MINE, Rochester diet, places, Au, Ag

DAYTON DREDGING CO
Dayton
PLACER, at Dayton townsite, Au, Ag.
Supt & Lessee: O A Herbert
Prod: 400 yde gravel

DE LA MARE, RODNEY W
& G W
Silver City
REMEGADE MOME, Washoe Co,
Au, Ag
Idle
TUMGSTEN MINE
SILVER HILL, Comstock dist,
lode, An, Ag
Idle

DE LONGCHAMPS, F J Box 3244, Reno Owner: N Nensel TALAPCOSA MINE, 15 mi 3 of Pernley, Au, Ag Little

DESERT MILLING CO
Box 9, Searchlight
Pros: W Hartman
VP: W F Ball, Jr
Geo Mgr: C H Chandler
Purch Agt: Frank Carter
QUARTETTE & DUPLEX MINES,
2 ml # of Searchlight, tailings &
ore dump, Au, Ag
100-TON CYAN MILL, Searchlight
Mine & Mill Foreman H D Chandler
15ts

DIAMOND GOLD MNG CO Jean Pres: PASimon

DONNELLY, L C
Reighter
SAWTOOTH PL MDIE, Humboldt Co,
Au

DOUBLE CHECK PROD CO Quarigna Pres: Ges E Anderson Oes Mgr: Ges F Elder Sec. Lowis Petralli DOUBLE CHECK MINE, 69 mi H of Reso, surface, Ca Prod. 34 tum

BURBIN, ROY Ballen OGLD TRAIL EXT, Eastgate dist, lode, Pb, Ag, Cu Mile CHALE MT MDNE, Pairview dist, lode, Ag, Pb, An

DWSCH PLAT MINES INC Winnesseed Property of Common Property of Common Property of Common VPI JE Hamon MENTES, 22 mil N of Winnesseed authority of Minnesseed Application, Au, Ng, WO3

BAGLE PICHER CO
Res 1805, Reno
CHEATON MINE, Borry Co,
Histomatons earth
MELL
History Arts & Chin)

PAGLE TUNGSTEN MINE Loning Owner: Harold W Pillington MINE, 14 mi NE of Luning, undergd, WOg Mine Supt: M P Portecus

EAST STANDARD MING CO c/o Ernest Woolley, Hotel Utah, Salt Lake City, Utah MINE, 55 ml SW of Ely, White Pine Co, Fb, Ag Idle

EL CAPITAN TUNGSTEN CO Gabbs Mgr: Gordon Smith EL CAPITAN MINE, Nye County EL CAPITAN MILL

ELY GOLD MINING CO Box 686, Ely Pres. W. G. Gosdman Sec & Mgr: W. J. Walker JENNY A. MINE, White Pine Co, Au, Ag Idle

RLY VALLEY MINES, INC Pioche Gen Mgr: John Janney Supt: Pat English ELY VALLEY & MENDHA MINES, Lincoln Co, undergd, Pb, Ag, Au, Zn, Cu Under dever

ERRINGTON-THIEL MNG CO Ruby Valley Phare: Mrs Alma T Errington, Oscar W Thiel ERRINGTON-THIEL, BIO MICA MINES, Ruby Valley, 65 mi 3W of Wells, undergid a curface, ruby mica, beryl, rare minerale HOLIDAY COPPER MINE, 50 mi 8 of Wells, undergid & surface, Cu, Za

ERB, H M Failon PYRAMID MINE, Holy Cross dist, lode, Ag, Cu, Pb

EUREKA CORPORATION, LTD
25 King Bt, W. Rm 2810,
Toronto, Ontario, Canada
Pres: Thayer Lindsley
VP & Ges Mgr: George W Mitchell
Sec: M R Jennings
Gen Supt: V A Many
Geol. John H Breso
Purch Agt: Willis A DePaols
RICHMOND-EUREKA MINE,
2 ml W of Eureha, underge,
Zo, Fo, Au, Ag
Mine Supt: Edward A Melka
Undar devail

PARNSWORTH, FRED Box 1173, Ely TIPPLE MINE, Robinson dist, lode, Au, Ag

PLETCHER MNG & MLG CORP Box U, Manhattan Pres: R W Fletcher FLETCHER MINE, Au Lide

GABBS EXPLORATION CO
Box i, Gabbe
Pres & Gen.Mgr: Lee D. Dougan
VP. Helen M. Dougan
Asst Gen.Mgr: B WenVoorhis
VICTORY TUNOSTEN MINE, 8 mi N
of Gabba, undergd, scheelite
Prod: 190 tune
Mine Forevian: James Corlett
105-TON GRAY-FLOT MILL

GARDHER MINES
BOX 413, Ely
Gen Mgr. C A Gardher
MINERAL PARM & MERRIMAR GRPS,
20 mi SE of Ely, undergd, Au, Ag, Po
Prodt E toms

OARNET TUNGSTEN MNG CO Owners: Surshine Mng Cô, Kellogg, Idaho GARNET-TUNGSTEN MINE, Min City, undergd, surface Under devel

GETCHELL MINE, INC
Box 2520, Reno
Press: George Wingfield
VP & Gen Mgr: N H Getchell
Boc: TL Willcom
Gen Supt: Royne A Bardy
Consul Engr: Roy A Bardy
Assayer: Roy Noima
GETCHELL MINE, Red House, 48 må
RE of Winnemucca, under gd & surface,
scheellie
Frod. 800-800 tans
Mine Supt: Wm J Newman
Asst Mine Supt: Emer Shail

1, 500-TON PLOT MILL. Mill Supt: Keith Kunse Asst Mill Supt: David Kinsel

GILLIAM, DALE R
Box 123, Montello
RUBY QUEEN MINE, Tuscarora dist,
lode, Ag, Au

OIROUX, L D & R J Box 105, Mina Supt: Matt Obert SAN MIGUEL MINES, MARIETTA MINES, 35 md W of Mina, undergd, Au, Ag

GLIDDEN CO, DIV 34, CALIF-NEV BARYTE MINES 765 SOM Ave. Oakland 1, Calif Pres: D P Joyce Gem Mgr: E L Ralston Purch Agt: A A Gibeast BARUM KINO MINE, Battle Mt, surface JUMBO MINE, Tomopah, surface barits

GODWIN, TOM & BERT Box 351, Lovelock BLUE SKY MINE, LIMERICK MINE, Pershing Co, Au, Ag

GOLD CORP OF AMERICA e/o PJ Burfening, Box 815, Reno HUNT GROUP (eight) Jumbo dist, lode, Au, Ag

GOLD METALS CONS MINES Box 361, Tonopah MINE, Nye Co, Au, Ag Idlu

GOLD RANGE COPPER MINE BOX 170, Mina MINE, 9 mi SW of Mina, surface, Cu, Au, Ag Idle (Leased to Milton R Sutton)

GOLD ZONE MINING CORP 300 Davis St, San Francisco, Calif Pres: Hans Hammer VP: M T Vanderslice Gen Mgr. A S Simrak Geol: P L Humphrey PAY MINE, 50 Mt SW of Ely, undergd Under devel

GOLDEN CENTURY INDUS, INC Box 591, Carlin COPPER KING MINE, 18 mi N of Carlin, undergd, Cu Supt: Prank Dean CARLCO LAKE MINE, Mn

GOLDEN DAWN MNG & MLG CO Searchlight Pres: H C Mills Mgr: G C Davis MORNINGSTAR MINES, Searchlight, undergd, Au, Ag, Cu, Pb Idle

GOLDEN EMPIRE MNG CO Searchlight Pres: JB Evans Purch Agt: Wendell Romine HERLAND MINE, Nelson, undergs, Pb, Zn, Cu, Ag Foreman: J Districh 35-TOH FLOT MILL, Nelson

GOLDEN ENSIGN MNG CO Box 74, Min City GOLDEN ENSIGN MINE, 1 mi E of Min City, undergd, Au, Ag, Pb, Me, WO₃ Supt: D C Despain Under devei

GOLDEN IRIS MNG CO e/o George Jestson, Ben 2347, Oroville, Calif GOLDEN IRIS MINE, Cloverdale dist, andergd, Au, Ag 23-TON MILL

COLDFIELD COWS MINES CO Box 2520, Remo Pres: George Wingfield VP & Gen Mgr: E A Jolian Sec: C M Sprading (See Call) GOLDFIELD DEVEL CO Box 687, Coldfield Pres: FJ Priday VP: George McKay Sec-Tress: NJ Barbarich -Gen Mgr: WJ Frank Ldfs

GOUDEY HATFIELD PO Drawer M. Gabbe JACK FOT MINE, 8 mi SE of Wellington, undergd, Fb, Zn, Ag, Au, Cu

GRAND DEPOSIT MNG CO
409 Nees Bidg, Balt Lake City, Utah
Pres: Paul C Lyon
GRAND DEPOSIT MINE, 25 mi NZ of
McGill, undergt, Pp. Zn, Cu, Ag, Au
Mine Supt: Paul C Lyon, Jr
Under deves!

GRANDVIEW MNG CO
Tonapah, via Fish Lake Valley Rt
GRANDVIEW GPS, Dyev, 68 mi 3 of
Tonapah, surface, WO3, Pb, Ag, Au
Prodi: 500 tona
10-TON MILL, Palmotto Mng Dist
Mill Supt: Red Ramin
Assay: J 5 Wisdom
(Rec Calif)

GRANO-LITE GOLD MNG CO Box 337, Yerington Pres & Gen Mgr: W E Slater VP: Guy Ludwick Met: Harry O Lewie Sec: W E Dial STANMOORE MINE, Hawthorne, 48 mai SE of Yerington, surface, Au, Ag Undwr devel

GREAT LAKES CARBON CORP DICALITE DIV Basalt via Tonopah PLANT #3, ourface, basalt Supt: John P McEwen (See Colo, Calif, New Mex, Ore & East)

GREY EAGLE DEVEL
CO, INC
Heorewe
Pres & Gen Mgr: F G Risley
VF & Assi Mgr: E6 Kirschenman
Met: E6 Eisenhauer
See: Teny Muzinich
Foreman: P O Liebel
GREY EAGLE MINE, 39 mt W of
Beowawe, undergd, Ag, Au, Fb, Za
Under devei

HALL, A Z.
Box 115, Beatty
CROWN POINT GLOBE MINE,
Johnnie dist, lode, Au, Ag

NALL, JOB 198 5 306 W, St George, Utah SILVER KING MINE, 40 mi NW of Picthe, undergd, Pb, Ag

HALL, JOB P & WHIPPLE, JOHN L MORNING STAR MINE, 40 mi NW of Pioche, Pb, Ag, undergd, surface Idle

NAMILTON CONS MINES CORP 300 Davis St, San Francisco II, Calif Press: R M Glessner VP: Jos Hornstein Gen Mgr: A 5 Simrah Sec: W E Sirbeck Geol: P L Humphrey ROCCO-HOMESTAKE MINE, 59 mi SW of Ely, undergd Under devet

HANCOCK IRON MINE-Box 255, Battle Mountain Owners: WR & Vera Hancock MINE, 32 ml 3 of Battle Mts, undergd, Fe Male

MARRIS, D.P., A.P. & D. M. Box 846, Tonopah KLONDYKE MINE, Remeraida Co, undergd, Pb, Ag, Au late

WAZEN & HARRIS Box 128, Carson City MARCK EAGLE MDIE, near Valmy, Ma Under devot BEDMAN, JOHN A
Box 312, Ploche
Gen Supt: Wm E Rogers
MINES, 30 mi W of Ploche,
undergd, Ag
Under devel

HENEBERGH, JOHN
Bon 152, Round Mountain
MINE, near Round Mt, U, Au, Ag

MERSEY, 11 B Box 333, Ely ANNA LEE MIME, Black Horse dist, lode, Ag, Au, Cu Lilie

SLI-BAR CO
Bon 90, Imiay
Pres & Gen Mgr: B C Mealet
RNON CANYON MINE, placer, A
WILLOW CREEK MINE, 13 ml S
of Mill City, surface, Au
Idle

HOALST, BLAINE C Box 133, Battle Mountain H & T MINE, Colcorda dist, lede, Po, Cu, Ag 1dle

HOMESTAKE MNG CO Tonopah (See Tonopah Devei Co)

BUDSON, ARTHUR
BOX II, Manhattan
STRAY DOG MINE, Nye Co, Au, Ag
Unober deveil

BUNLEY, WILLIAM M Box 23, Lovelock SILVER STAR MINE, Star dist, lode, Po, Ag, Au Life IROH HORSE MINE, 20 mi E of Lovelock, surface, Fe Frad: 300 toms

BUTCHINSON MINE Wadeworth Owner: Emile Cabanne BilnE, Waite Horse dist, Au, Ag Idle

MYDE, EMERSON J Manhattan BIG FOUR MINE, Manhattan dist, Au, Ag idle

IMPERIAL OPERATING CO 503 Brighton, El Centro, Calif UNION LEAD (COMMONWEALTH) MINE, Goleon diet, lode, Pt. Zo, Au, Ag, Cu

\$NDUST MIN & CHEM COdin & Gliman Ste, Berteley, Calif Pres & Gon Mgr: L. R. Meretti JUPITER MINE, 2 ms S of Weeks, ourface, fuliers earth Intermittent oper by postractor

IMTERSTATE OIL & DEVEL CO Box 1188, Elba Pres: W A Hayes, 156 Monigomery St, San Francisco, Calif HILL GOLD PLACER, VISTA GP SILVER-LEAD LODE LITTLE GEM MILL, 75-ton flot,

ISBEL CONST CO, (MMG CONTR)
Remo
Pres: C V Isbell

JACOBSON, J.F.
Box 54, Goodsprings
BULLION MINE, Yellow Pine
dist, iode. Pb, Zn. Ag, Cu, Au
BELL MIRE, Lode, Pb, Ag, Cu, Au
YELLOW PINE, Lode, Zn. Pb, Ag,
Cu, Au
BULTAN MINE, lode, Zn. Pb, Ag,
Cu, Au
Yellow Pine dist
idle

JEPPERSON, E R Box 24, Battle Mtn BENTLEY GROUP MINE, Battle Mt dot, lode, Pb, Ag, Cb, Au Under devel

JENSEN, HAL Box 267, E Ely GRAND PRIZE MINE, lode Pb, Cu, Zn, Ag, Au ONETHA MINE, lode, Pb, Cu, Ag, Au White Pine dist

JOHNSON, GRORGE H Box 558, Levelock C & M CLAIM, Perenting Co, Au, Ag

JOHNSON, LEO K Box 43, Silver City BUCKEYE MINE, Silver City dist, lede, Au, Ag

KAISER ALUM & CHEM CORP Box 901, Fallon Shet; G. L. Frayser See: Reta E Agnew Gen Supt: Harley D Phillips Geol: Perry West Furch Agt: N F Maynew KAISER MINE, 63 m E of Fallon, undergd, CaPg Mine Supt: R C Kirchman Under Sevel 120-TON FLOT MILL, Fallon

KENNECOTT COPPER CORP.

NEV MINES DIV

MINGILI
Gen Mgr: JC Kinnear, Jr.,
Asst Gen Mgr: Paul Hett
Parch Agt: W B Ireland,

MINE, Ruth, open pst, Cs, As, Ag, McG
Gen Supt: S W Smith
Asst Supt: R C Nispet
Ch Engr: K W Booker
20,000-TON FLOT CONCENTRATOR

SMELTER, two reveroperatories
100,000,000 lbs Cu per year

Mech-Elice Supt: W K Sanders
Concen Supt: L G Immonen

Smelter Supt: Ed Pescut
Cons Supt: W F Jones

Biv Compt: R W Crosses

Biv Compt: R W Crosses

Biv Comptex R W Crosses

Biv Comptex R W Crosses

Biv MCATHERR RY (Subsidiary)
Gen Supt: H M Peterson
Gen Aug. New Mos. Utah & East)

KEY WEST NICKEL & COPPER CORP 313 5 18th St, Las Vegas Pres & Gen Mgr: A F Carper VP: N W Staley Sees; John McKess Purch Ags: A F Carper KEY WEST MINE, Rivereide via Moapa, 15 mis S of Bunkerville, surface, Cs, Nt, Pt. Prod. 35 tons 35-TON ACID LEACH PL

BING MINES
Beacon Bidg, Sait Lake City, Utah
ONETHA, DRO WEST ONETHA &
MILWAUKEE CLAIMS, Hamilton,
49 mi W of Ely, undergs, Pb, Ag, Zn, Cu
litie

KIRBY CANYON MINES, INC Box 108, Goodsprings Pros: G G Gressman VP: A P Robbins Sec: Julia Robbins KIRBY CANYON MINES, Geodsprings, undergd, Fb, Ag 16le

KNOWLES & MONTROSE CO Mountain City GARNET HILL & MONTROSE MINES, 21 md E of Mt City, undergd & surface, W Under devel (Leased by Sunchine Mng Co)

KOOFOLIS, MARTHA Beatty MAUCHTY BOY MINE, lode Fb, Ag, Au LUCKY GROUP MINE, lede Pb, Ag, Au Johnnis-Bird, GOLD CROWN GROUP, Fluorine diel, bide, Au, Ag Adle

LAMB, CLINN E Lovelock ANNIE CLAIM, Seven Troughs dist, Pershing Co, Au, Ag

LEAD KING MINES, INC
Box 1806, Lee Vegas
Pres & Gen Mgr: James H McCarthy
YP: Frank LeGrange
Sec: Richard L Neville
MINE, 14 mi NE of Las Vegas,
under de surface, Pb, Ag
Under devel

LIMDSAY MINING CO
Box 150, Mina
Pres: Chas Scharf
VP: Dr H G Campbell
Sec: W F Bistop
Gen Mgr: Kenneth W Dutham
GUN METAL MINE, 34 mi SE of
Mina, undergd, WO3,
Frod; 80 tore
GRAV MILO.

LOCKE, M E Locke's via Tonopah MOREY MINE, Nye Co, undergd, Au, Ag, Pb

LONCAR, JOHN
Box 700, Tonopah .
GOLD BAR-COLORADO MINE,
3 mi SE of Lida, Ag, Pb, Zn
Idia

LONDON EXT MINING CO Becowave, Surface, Au Boowave, Surface, Au Supt: B B Warmbrodt 450-TON CYAN MILL Supt: H C Bishop, Jr Urst Coto)

LONG CANYON MNG CO, INC c/o Archie P Farr 2784 Jefferson Ave, Ogden, Utah Sec: Ben Van De Graff KNOB HILL MINE, if mi E of Lee, Ruby Range dist, wodergd, Pe, Ag

LORANGER, W E Silver City HAYWARD MINE, Lyon Co, Au, Ag (Leased from St Joe Cone Mines)

LOW, W L & C M OGEE Box 429, Winnemucca RAINBOW MINE, Bottle Cr diet, lode, Cu Under devei

MACBOYLE, M & SAM HAIN Box 326, Goldfield WISCONSIN GROUP MINE, Lida dist, lode, Au, Ag, Cu, Pb, Zn Elik

MANGANESE, INC
BOX 2008, Henderson
Press: 18 West
VP: W.L. Long
Gen Mgr: F A McGonigle
Met: F W Fischer
Gen Supt: 8 J McGarroli
Purch Agi: L. D. Richardson
THREE KIDS MINE, 6 m E of
Henderson, surf, MnOg, Ps
Prod: 1500 tons
Mine Supt: Ed C DeMoss
Mine Engr: John T Atkins
4,500-TON FLOT MILL
Mill Supt: A J Anderson
KILM, 120,000 tons of f 45% MnOg
nodules per year

MANHATTAN CONSOL MINES

4 DEVEL CO
Tonopah
(See Arizona)

MARIGOLD MINE & MILL Box 44, Valmy MINE, 4 mi 3 of Valmy, undergd & surface, Au Idle (Leased to R L Brantley)

MARSAM ENTERPRISES INC BILLS Bewerly Dr., Bewerly Hills, Caiff Pres: Samuel Weiler VP: Jules Berliner Sec-Treas: Selina Weiler Gen Mgr: FD Shuck T BONE MINE, 9 ml 8 of Austin, undergd, W 50-TON CUSTOM MILL Under devel

MARSHALL MNG CO
Contact
Gen Mgr: Maurice M Marshall
MARSHALL MINES, I mil W of
Contact, undergd, Cu, Ag, Au
Frod: 25 tons
Mine Supt: M M Marshall
Aset Mine Supt: G V Marshall
Mine Foreman; Leo R Bricker

MARTIN & PAYNE Jungo COPPER QUEEN & RED BUTTE CLAIMS, 34 mi NW of Jungo, surface, Cu

MARY ANN PLACER MINE Baker Stage via Ely Owners: States, States & Green MINE, 40 mt SE of Ely, Au, Ag Under devel

McCOY, BLAINE Box 116, Mina NORTH STAR MINE, Cedar Mt dist, lode, Cu, Pb, Au, Ag, Zn

McLANE, R M Box D, imlay WATCHEZ MINE, Sterra dist, Pershing Co, Au, Ag Edie

McQUEEN, FRED
Sox 1137, Ely
ANNEX GROUP MINE, Robinson
dist, lode, Pb, Ag, Au, Cu, Zn

MAY DAY MINE
Box 25, Silver City
Owner: JS Jones
Oper: A C Wilson
MINE, Voltaire dist, lode,
Pb, Au, Ag, Cu
Edia

MED LEAD & SILVER MNG CO First Nat'l Bank Bidg, Sait Lake City, Utah Pres: Pete Marthakis Gen Mgg: C A Elkins VICTORY CLAIMS, White Pine Ce, Au, Ag, Zu, Fe Elle (Leased from O H Evans)

MERKT BROS
Box 103, Fallon
GRAND VIEW MINE, Washington
dist, lode, Pb, Ag, Au, Cu, Za
IIIIs

METALLICS UNLIMITED Box 0, East Ely CAMPANELLA-PINE NUT MINE, 4 mi NW of Cherry Creek, undergé, sheelis Prod: 25 tons

MILLER MT MNG CO
cfo Jesse C Cuddeback
Star Rt, Lawe, Calif
MILLER MT MINE, Esmeralda &
Mineral Co, undergd, Fb, Zn, Ag
Under devel
NEV EXT & SILVER CLTY OROUP,
Buena Vista dist, lode, Fb, Zn, Ag

METALLURGICAL DEVEL CO, INC
Box 101, Gardnerville
Pros & Gen Mgr: Joe C Morrie
VP: John S Dundel
Sec: E W Graunke
MINE, 12 mit 5 of Gardnerville,
surface, WO3
Prod: 50 tons
GRAV-FLOT MILL

MINERAL MATERIALS CO 1145 Westminster Ave, Alhambra, Colif BUENA VISTA IRON MINE, Box 645, Lovelock, 30 ml E of Lovelock, surface, Fe (Sec Calif)

MINERVA SCHEELITE MNG CO Box 901, Ely Gen Mgr. R Stopper SCHEELITE CHIEF, 50 mi SE of Ely, undergd, W Prod: 15 tons 25-TON GRAV MILL

MINK, J W
560 9th St, Elko
ROSEBUD MINE, 80 mi N of Elko,
undergd, Au, Ag, Pb, Cu
Under devel
LITTLE JOE MINE, Goldcreek, 83
mi N of Elko, surface, WO3

MOHAWK MNO CO, .INC c/o Carl Lemons 65 W Center St, Fallon MOHAWK MINE, White Wolf dist, lode, Au, Ag / ARGENTITE MINE & MILL

MINING WORLD

MORE, JIMMIE D Box 67, Sparks BUTTE MINE, Washoe Co, Au, Ag

MORLEDGE, F L, LESSEE Box 180, Overton RED GORGE MINE, Overton,

MUTUAL VENTURES SYN 409 Nees Bldg, Salt Lake City, Utah Pres: PC Lyon Gen Mgr: PC Lyon, Jr GOLD NOTE MINE, 57 mi S of Winnemucca, undergd, Pb, Ag, Au, Za, Cu Under devei

N & M MINING CO
Inne
Pres: N R Newman
Sec: Ed R Moore
COPPER KING OROUP, 3 mi S of
lone, undergd, Cu
Prod: 12 tons
Supt: J J Kineella
Foreman: L O Warfield
12 TON LEACH PL, Berlin

NATIONAL COPPER MINES, INC Box 162, E Ely Pres: R M Prince VP: Paul C Lyon Sec: R C Jensen KANSAS COPPER MINE, McGill, 25 ml NE of McGill, undergd, Cu, Ag Mine Foreman: P C Lyon, Jr Under devel

NAT'L LEAD CO, BAROID SALES DIV Dunphy ROSSI MINE, open pit, barite Supt: Marcus Durfee (See Calif, Mo, Tex, & Central)

NAT'L LEAD CO, TITANIUM DIV HEOGETANO TITANIUM REFINERY Under devel (See Cair, Mo, Tex, 8 Dak, & Central)

NATOMAS COMPANY
Battle Mountain
Res Mgr: Z J James
Office Mgr: E F Hunter
Engr: H E Dorian
GREENAN PLACER OPER, 18 mi SW
of Battle Mi, placer, bucket dredge,
Au, Ag
Prod: 8, 700 cu yds
(See Calif)

NEEDLE PEAK FLUORSPAR Bastle Mountain FLUORSPAR CLAIMS, 40 mi SE of Battle Mt, surface Under deval (Leased to Ford T Frost)

MEVADA PLAGSTONE QUARRIES, INC Box 1269, Las Vegas RED BLUFF MINE, Las Vegas

NEVADA IRON ORE CO &
FARKER BRGS
c/o H S Thomas & N E Parker
Box 283, Lovelock
IRON RR LEASE, 26 mi E of
Lovelock
Frod. 300 tems
Supt: Chas Roe
Foreman: F Parker
BLAST FURNACE

NEVADA LEAD & ZINC CO Lesse: M H Woodward 2608 S State, Sait Lake City, Utah KILLIE (NEV LEAD) MINE, Spruce Mt dist, lode, Pb, Au, Ag, Cu, Zn Late

NEVADA-MASSACHUSETTS CO Tungsten
Press: C H Segerstrom, Jr
VP: M D Cronwall
Gen Supt: W G Emminger
TUNGSTEN MINE, 0 mi N of Mill
City, undergd a surface, W
Frodi 450 tons
Mine Esqr: E Nash
Mine Esqr: D O'Keefe
450-TON GRAV-FLOT MILL
Mill Sept: J R Caldwell
Assayer: R V Hoble BEVADA METAL MINES CO 222 Atles Bidg, Salt Lake City, Utah Pres & Gen Mgr: B R Fisher VP: Leon Fonniesbeck MINE, near Imlay, Au, Ag, Pb 188

NEVADA MINE DEVELOPERS, INC Winnemutta LITTLE JUPITER MINE, Sierra dist, lode, Au, Ag, Cu, Pb, Za

NEVADA MONARCH CONS MINES c/o H Casier, Wells MONARCH MINE, Elko Co, Ag, Pb, Zn, Cu

NEVADA PACIFIC DEVEL CO Box 186, Gabbe Pres & Gen Mgr: G N Tawsan COMPANY MINE, 6 mi NE of Gabbe, undergd, W

NEVADA RAWHIDE MNG CORP 505 End St. Cheney, Wash Pres: Clarence Davis VP: Nolan Brown Sec: Ernest Ruden Gen Supt: 1 M Erb Geol: Ray Robinson PYRAMD MINE, 30 mi S of Fallon, undergd, Ag, Au, Fb Prod: 4 tons 25-TON FLOT MILL, 3 mi from mine

MEVADA SCHEELITE, DIV
OF KENNAMETAL, INC
488 1/3 STAYOR St, Fallon
Gen Supit: E M Colwell
Met: L W Traince
Mech Engr: K L Colwell
Purch Agt: Geraidine Marsh
NEVADA SCHEELITE MINE, Box 871,
Fallon, 40 mi N of Hawthorne, undergd,
scheelite
Prod: 90 tone*
Mine Supit: H P Manny
Mine Engr: Jack Frank
150-TON GRAY PLOT MILL
Mill Supit: Mark L Campbell

NEVADA SILICA SANDS, INC Box 150, Overton Gen Mgr: P L Morledge SILICA MINE & NEV MILL, Overton, surface Supt: E V Hickman 300-TON PLOT MILL, Supt: Walter Huntsman

NEVADA TUNGSTEN CORP Box 194, Mina Pres & Gen Mgr: John Sinkey GENTRY MINE, 15 mi E of Schurs, WO₂ 200-TON GRAV MILL, Sodaville Assay: T W Molthes

NEW WORLD EXPLOR,
RESEARCH & DEVEL CO
319 5 Virginia St, Reno
Pres. Russell T Miller
VP & Mech Engr: F Quiett
VP & Geol: R Decker
Meti John Unside
ALADDIN MINE, Box 909, Elko,
30 mi SW of Elko, undergd, Ph, Ag, Cu
Prod: 80 tons
MCCOY MINE, 30 mi S of Battle Mt,
surface, Pe isite
CARICO MANGANESE MINE, 50 mi
S of Battle Mt, surface, Mn
Under deveri

NICKERSON, L 3
Box 117, Lovelock
PORTLAND EXT MINE, Seven
Troughs diet, lode, Au, Ag

NIGHTINGALE MINE Lesses: The Wolfram Co Lovelock Mgr: John Heiser MINE, Pershing Co, W

NINETY-NINE MINE, INC Goodsprings Pres & Supt: A J Robbins MINE, Goodsprings, Cu

NIVLOC MINE c/o Edward Hinne Mispah Hotel, Tonopah MINE, 7 mi SW of Silver Pesk, undergd, Ag, Au, Pb Under devei NOONDAY MINES, LTD Box 11, Wells Pres: JB White VPA Gen Mgr: PH Croeby Sec: NG White NOONDAY MINE, 55 mt 8W of Wells, undergd, Fp. Zn, Ag Under devel NOONDAY MILL, under const

NUNN COMPANY, THE BOX 133, Overton Gen Mgr. Paul G Numm MINE, Surface, ellics sand Supt: L P Keller Engr: C L McCallum 500-TON HYDRAULIC MILL

OHIO MINES CORP
78 E McMicken Ave,
Cincinnati, Ohio
OHIO MINE, Goldpoint, undergd,
Au, Ag
Life
CYAN MILL,
Under devel

OLD BARNEY'S OOLD
MINES
Searchlight.
Pres: H M Morse
Gen Mgr: Roy Williams
Tress: I O Napa
GOOD HOPE MINE, Au, Ag, Pb
Supt: Roy Williams
100-TON PLOT MILL,
Under devel
\$LOSSOM MUNE, Clark Co, Au, Ag

OLD ENGLISH GOLD CORP Box III, Provo, Ulah Pres & Gon Mgr: Joseph Hafen VP: Carl J Harris Purch Agt: Leon Newren OLD ENGLISH MINE, Troy Canyon,

undered, Au Supt: Owen Peterson 30-TON PLOT MILL

O'LEARY J & LOUIS V CIRAC Box 313, Tonopah SONE MINE, Union dist, placer, Au, Ag Idia

ONSTETT, RALPH Star Rt, Box 72 Grass Valley, Calif ESTELLA MINE, Mt City diet, placer, Au, Ag

ORIG KLONDYKE DIVIDE MNG CO Box 846, Tonopah ORIG KLONDYKE MINE, Klondyke dist, lode, Ag, Au, Cu, Pb Ellie

OTT, VICTOR 95 Eddy St. San Francisco 9, Calif ALLIED MINES, lone, 100 mi from Fallon, surface, CaP₂

PABCO PRODUCTS, INC
Box 1546, Henderson
WHITE EAGLE PIT MINE, 6 mi N
of Henderson, surface, gypeum
MILL

PACIFIC BUTTE MINES
c/o W B Naismith, Tonoph
MONTEZUMA MINE, Esmeraida
Co, Au, Ag, Pb
EVA MINE, 38 mi S of Tonopah,
undergd, Pb, Ag, Au
NEW YORK MINE, 39 mi W of
Goldfield, undergd, Pb, Ag, Au
title

PANSY LEE MNG CO Box 733, Winnemucca Oper: B C Hanford PANSY LEE & W COAST MINES, Il mi NW of Winnemucca, undergd, Au, Ag, Pb

PAYMASTER MINE Buttle Mountain Owner: Paul C Christopher MINE, 19 mi SE of Battle Mt, undergd, Ag, Au, Pb Under devel

PEER, GALE G
Eastgate via Fallon
ORO PLATE MENE, Churchill Co,
Au, Ag

PETERSON, G A
207 W 4th St, Carson City
NEW POTOSI MINE, 25 mi S of
Mine, Candelaria (Columbus)
dist, undergd, Pb, 3b, Ag, Au
Fred: 10 tuns
Supt: Joe Marinelli
CEDAR CHEST, 38 mi E of Mina
undergd, Wtg
Prod: \$ 1000

PETERSON, M P & LORENA Box 131, Tonopah OLD COWGIRL MINE, 80 mi NE of " Tonopah, Au, Ag Under devel

PETERSON MNG & MLG CO Austin Owners: Peterson & Pisher MINE, Lander Co, Mn

PETERSON, W S Sulphur STREETER MINE, 4 mi E of Sulphur, surface, Pb, Ag, Cu, Za SULPHUR MILL, S

PHILLIPS, EDWARD B Gabbe ILLINOIS EXT CLAIMS, 12 mi N of Gabbe, Pb, Zm, Ag, Au Edia

PIOCHE MINES CONS INC Fronte POORMAN MINE, Pieche dist, lode, Pb, Ag, Au, Cu, Mn

PORTLAND MINE & LAUGHTON & CAUSTEN MILL Box 114, Lovelock MINE, 25 ml N of Lovelock, undergd, Au, Ag Lessee, Earl Tucker

PLATORIA URANIUM CORP Deover Pres: A N Sweet VP: J M Anderson Sec-Treas: Irving Linder MOONLIGHT CLAIMS, 70 min NW of Winnermucca in Kinge Riv Valley, U Under devei

PRINCE CONS MNG CO 818 Kearns Bldg, 8al Lake City, Utah Pres: David L Gemmil Sec-Treas: R Warburton PRINCE MINE, Zn, Fb, Au, Ag (Leased to Comb Metals Reduction Co)

PROUD, IRA
Box 388, Willite, California
CLARK MT VIEW & SANDY VIEW
CLAIMS, Goodsprings dist, lode,
Zn, F9, Ag, Cu
idle

PYRAMID MINING CO c/o Fred Hess, Virginia City PYRAMID MINE, Cometock dist, lode, Au, Ag

PYRAMID CO, INC, LESSEE Silver Peak MG L MINE, Perehing Co, WO₃

RED HILL FLORENCE MNG CO Goldfield Pres & Treas: Frank J Friday VF: J W Boesch See: A Frank, Tonopah Gen Mgr: Wm J Frank, Tonopah FLORENCE MINE, 1 mi E of Goldfield, underground

REDUCTION MLG CORP Searchlight MILL, Au, Ag, Pb, Cu

REED, HE & GUS ROTGERS Box 31, Winnemucca Gen Mgr: B E Reed RED BOCK MING, 35 mi W of Imlay, undergd, lode, Ag, Au Prod: 3 tons 3 TON AMALG PL 55 TON MILL REGAN, JOHN
MASON
SANTA CRUZ & EMPIRE MINE,
Mineral Co, Ag. Pb. Zo
Idia
McCONNELL LODE, Yerington
diat, Cu, Ag
Idia

RENO PRESS BRICK CO Bow lif, Reso GENGER MINE, Washoe Co, slay

REVILLE LEAD MNG CO Boot 172, E Ely Pres & Gen Mgr: P Farnsworth Dir: N M Johnson Mgr: Wayne Cole REVILLE LEAD MINE, W of Revilla, undergd, Au, Ag, Ph, Za Purch Agi: N W Young Mine Supt: W Cole Acst Mine Supt: W Cole Acst Mine Supt: Welda Cole Engre: P W Millard & Son Accopt M Pray

RICE, JEPP & JOHN A PRICE Box 863, Winnermack RIO 91 & Z. As. Ag. KING GOLD 27 MINE, Winnermack (Ten Mile) diet, Au, Ag

RICE, OWEN

SERVER

DOE RUN MINE, Eureka Co, Ag. Ph

RIECK, N R & MOALST, BLAINE C Haule Min SILVER CHIEF MINE, 8 mi ME of Bettle Min, undergd & surface Idle

RIP VAN WINKLE CONS MHG CO BOX 1650, Sait Lake City, Utah RIP VAN WINKLE MINE, Elko, Au, Ag, Pb, Zn 128-TON FLOT MILL

ROBINSON, SAM M.
Box 1281, Ely
COLUMBILA & KEYSTONE MINE,
Ini E of Ruth, undergd, surface,
Zo, Fp., Cu, Au, Ag, Mn
UMSC, Lane City, 3 mi W of Ely,
undergd, Mn, Zn, Pb, Ag
Prod: 10 tons

ROCHESTER CONS MINES CO Box 521, Lovelock ROCHESTER MINES, undergd, Au, Ag Supt: M E Bohannon Cone Engr: L B Wright Little

BOCK HILL TUNGSTEN MINE Som 138, Minn Operators Mrs Irone Sykee Miss

RODERS & GEIGER
Hew M. Wienemenses
Mgr: Own Regers
ANTELOPE SPRINGS MINE, 30 mi W
of Imlay, undergd, Ag. Pb., Ze.
Litts

RONG, GEORGE W
PO Bos 15, Manhattan
VIRQUELA CETY PLACER, Manhattan
diet, Am, Ag
Lille

ROOT ZINC LEASE
Bos 156, Canchiprings
Gen Mgr: R K Hamilton
Supt: L F Jacobeon
BOSS, PILORIM, ROOT & YELLOW
PHE MINES, Ag. Pb
79-TOM CHAY MULL
LES

ROSEN CRASS MINE Pumbe Proces Orban Cole Gen Mgy: J O Hulee DEMOCRACY MINE, 67 mi H of Pioche, undergé, Mn, WO₂ 1612

ROUND MY GOLD DRG CORP Sti CAM In, San Francison, Calif Frest P C Van Deline VPu: W C Browning, Bugh Rose Asst See Treas: S J Gorman ROUND BT MINE, placer, 58 ml H of Tonopah, An, Ag MOYERAH PARTNERS Non 881, Elko Pres & Gen Mgr. E G McIntouh Gen Supt: A Stefan Moch Engr: V Jones BELLVIEW MINER, 64 ms SE of Elko, undergs, Po. Ag.Cus Under devei

BUGGLES, A L & SONS
Cherry Creek
LAUGHING BDLAN GP, 3 mi S of
Cherry Cr in Egan Canyon, undergd,
WG
Under devel
EXCHEQUER GP, 4 mi NW of Cherry
Cr, undergd & placer, scheelite, Au, Ag
Fred: 135 toon in 1 mo

RUTH ELDER MINING CO Rom 186, Searchlight Owner: William Barton RUTH ELDER MINE, 2 mi N of Searchlight, undergd, Au, Ag

SALT LAKE - PIOCHE MNG CO 440 S 4th W St, Sait Lake City, Utah Pres: N H Martin VP: L W Hillman Heev O H Martin APEX & FERANCIER MINES, 1 mi SE of Pioche, Au, Ag, Pb, Cu

SAN RAPAEL MINE Gabbs Lesses: L. H. Dickens, Hill & Chiatorich & Charles Hemmock MINE, 15 mi W of Gabbs, Quarta Mt dist, undergd, Pb, Ze, Au, Ag Idle

SCHWEISS, FRANK, ESTATE Eactgate via Fallon OOLD LEDGE GROUP, Churchill Co, Au, Ag idle

BEARISCUIT MINE
Box 34, Goodsprings
MINE, Yellow Pins dist, Pb, Zs
Life
(Leased to Thos J Hammers)

SEARCHLIGHT CONS MINING & MILLING CO

-fo Homer Mills, Searchlight
BLOSSOM MINE & MILLs, Clark Co,
undergd, Au, Ag
OOOD HOPE CROUP, Searchlight
dist, lode, Au, Ag
Litis

BEARCHLIGHT HOMESTAKE
MINING CO
Box 65, Searchlight
Pres & Gen Mgr: F C Moore
Sex: Donald Feters
Gen Supt: F C Moore, Jr
QUARTETTE MINE, 1 mi S of
Searchlight, undergd, Au, Ag, Cu, Pb
Lille

SEE, NEWTON A Eco 327, Winnermotes ORANGE MINE, Warm Springs dist, lode, Au, Ag COYOTE MINE, Winnermotes dist, lode, Au, Ag

SEGERSTROM, HEIZÉR MINES
Lovelock
Supt: FH Dunn
IRON MINES, open pit, truck, Fe
700-TON CAUSHING & SCREENING
FL
SUTHERLAND MINE, 15 ml HE of
Lovelock, Sh
1616
HOLLYWOOD MINE, 50 ml NE of
Lovelock, undergd, 50
Life
Life

SRLIG, A & R Manhattan SUNSHINE & MILL LODE, Nye Co, Ag, Au

SHAW, CLARK C
889 Numbold St, Fallon
CAMP TERRELL CLAIMS, 90 mi S
of Fallon, Churchill Co, Holy Cross
dat, undergd, Ag, Au, Pb
Lide
FLOT MILL

SHAW, LLOYD
SEE Humbolds St., Failon
ANGLO-SAKON MINE, Churchill Co., As, Ag
LES

EHENANDOAH MINERALS CO
a/o Darwin Lambert,
Box 483, Ely
DOG STAR LODE, White Pine dist,
PP, Za, An, Ag
Lille
- SUNDOWN LODE, Dunk Creek diet
GIANT & FREDERIC C LODES, Twin
River diet, Pb, Za, An, Ag, Cu

SHIELDS, ALDEN D 284 West Center Street, Fallon MONAWK MINE, Loti (Mammoth dist), lode, Pb, Ag, Au Edia

SHULTZE CLAIM
Becowswe
SHULTZE MINE, 38 mi S of Becwawe,
undergd, Ag Pb, Au, Zn
SMELTER, 80-tone per month

BIRRRA TALC & CLAY CO
Box 300, S Pasadems, Calif
OASIS MUNE, 55 mm NW of
Goldfield, undergd, tale
Supt: F A Bachich
Engr: D B Kempfer
(See Calif & Central)

61LVER DYKE MINE Box 229, Mins Owner: Chauncy Florey MINE, 13 on W of Mins, undergd, Frod: 40 tons Mine Supit: Tony Weiler Mine Foreman: Sherman Egger 70-TON GRAY MILL, Mins Mill Supit: Lynn Glondenning

SILVER ROCK MINES CO e/o II R Fisher, 222 Atlas Bidg, Sait Labs City, Utah SILVER ROCK (WYRONA) MINE, Eureka dist, lode, Ag. Cu, Pb, Au 125e

SIM PLOT, J R. CO Continental Bank Bldg. Boise, Idaho SIMPLOT IRON MINE, 30 mi S of Palisade, undergd Supt: John Kobe Ldfe (See Colo & Idaho)

SINGAYZE SYNDICATE Walturka MINE, surface, perlite Mgr: B J Penrose Lilie

SIRI & GUBLER
Box 533, Ely
GREAT VALLEY MINE, 45 mi W of
Ely, undergd, Pb, Ag, Cu
Lilie

SKY LINE ANNEX MINE
Box 1043, Tonopah
Operator: LB Sammone
MINE, 18 mi W of Tonopah, undergi,
Ft. Zon, Cu

SNO-LITE PRODUCTS CO Box 56, Reso Pres: C J Catron PERLITE PL, Cometon Drive, Resi

SNOREEM & SOMS Box 142, Overton KAGLIN WASH SELICA SAND MINE

SPEZZI, RAYMOND A Mason MASON VALLEY MINE, Lyon Co, Eu

STANDARD SLAG CO
Box 5, Gabbe
Prest L A Beeghly
VP; WE Blins
Sec-Treas: Wil Klienway
Western Mgr: E O Jones
And Mgr: E V Wines
GREENSTONE MINE, 2 mi E of
Cobbe, ourface, magnetia
Frod: 300 tons
Supt: P W Reinmiller
Engr: J R Harmon
300-TOM GREENSTONE MILL,
salvining
Mill Supt: P W Reinmiller
And Suppl: B J Wiley

STAR METAL MINES Elian Owner: PG Gribble MINE, N E Mountain City, W. Sb Under devel STEWART, H H Cornell St, Big Pine, Calif HIDEOUT MINE #1, 45 mt SW of Goldfield, epen pit, tale LOUSE MINE

STINNETT, JAMES T Box 125, Eureka LAST CHANCE MINE, lode, Za, Ag, Cu, Pb

STRAND, WILLIAM 600 Wildes St. Pallon RAWHIDE TUNGSTEN MINE, 3 mi NE of Rawhide, undergd, schoolite Under devel

STORMY DAY MINE
61 State St. Reno
MINE, 14 1/2 mi 3 of Gerlash,
undergd, WO₃
Prod: 35 toms
Mine Supt: John H Uhalds

STREETER, O J
BOX 485, Elko
SUMMITT VIEW MINE, Elko Co,
Ag, Po

STRESHLEY, AUGUST Austin MOOMBA MINE, Twin River dist, lode, Pb, Au, Ag, Cu, Zn Idle

SUMMIT KING MINES, LTD Box 633, Fallon Pres: Ira B Joralemon Gem Mgr. Percy G Dobson (See Tonopah Devel Co)

SUMMIT QUEEN MINING CO Box 2044, Reno Pres & Gon Mgr: S O Baker VP: Nello Confiantina, Jr Sec-Treas: Harry Baer HONOLULU MINE, 30 mi E of Patlon Litts.

SUNNYSIDE MILLING CO Austia Owner: Samuel Weiler Gen Mgr: FD Shuck SPENCER HOT SPRINGS MILL, 50ton grav-flet, schedite

SUNNYSLOPE MINB Rt 1, Box Sel, Reno Owner: Weeley J Critton MINE, 35 at 3E of Verington, undergd, Au, Ag Idls 35-TON MILL, plates, conces

SUSMILL, JACK
Battle Mountain
HUMBOLDT COPPER MINE,
Humboldt Co, Ag, Cu
Lide

SYLVIA D MINING CO, INC Rawhide via Fallon RAWHIDE PLACER MINE, Rawhide dist, placer, Au, Ag

TANNER, B L Box 37, Searchlight SEARCHLOUT INSUL PROD MINE, 7 mt NW of Searchlight, ourface, perline MILL

TEXAS #3 MINE c/o Ray B Clemmons, Wadeworth MINE, Au, Ag idie

TONOPAH DEVEL CO Tompah Opers: Summit King Mines, Led, & Homestake Ming Co MiNE, i mi N of Tonopah (See Summit King Mines, Lad, in Nev & Homestake Ming Co in S Dak, Utah)

TONOPAH DIVIDE MEG CO Box 1564, Reno Pres: B H Luce VP: WE Struck DIVIDE MINE, 6 mi S of Tunngah, undergd, Au, Ag Like

TONOPAH MNO CO OF HEV c/o ii A Johnson, Resident Agent, Tonopah MLEPAH MINE, Mannettan diet, lode & mill, Au, Ag

MINING WORLD

TOULON MILL
Levelock
Levelock
Levelock
The Wolfram Co
Mgr: John Heiser
TUNGSTEN MILL, Perching Co

TRI-STATE METALS, INC
Mesquite
Pres: T J Lonto
Gen Mgr: W F King
Sec-Treas: Reuben Ten Hahen
SLI-VER LEAD MINE, 18 mi 3 of
Mesquite, undergd, surface,
actaetitie
Prod: 50 tons
Mine Foreman: Marel Bradshaw
300-TON GRAY MILL under constr

TUPPSTONE PROD CORP Box 150, Sparks MINE & MILL

UNITED MINERALS CORP 318 Pelt Blog, Salt Lake City, Utah Gen Mgr: G W Snyder, Jr RIP VAN WUNKLE, LUCKY STRIKE, TEMPLE TUNGSTEW, MONTE CRESTO MINES 1500 ACISONAL

U S GYPSUM CO GYPSUM MINE, Empire, surface KODAK FERLITE MILL, Box 31, Fallon (Dodge Cone Co) (Bee Calif, Colo, Mich, Mont, Tex, Utah, Wash, Central & South East)

US LIME PROD CORP
Box 127, Henderson
Pres: WO Anderson
Pres: WO Anderson
VF: JI Anderson
Gen Mgr: K Ells worth
Bee: E B Long
Gen Supt: L N Grindell
BLOAN MINE, Box A, Sloan,
18 ml S of Las Vegas, surface,
idoinmite
Prod: 509 tuns
Supt: Wm E Ellis
ARROLIME MINE, Box A, Sloan,
18 ml N of Las Begas, surface,
limestone
Supt: Wo Brown
Prod: 2,000 tons
120-TON MILL, Sloan, calcining
a processing
240-TON MILL, Sloan, calcining
a processing
Plant Mgr: Wm B Mainor

U S VANADIUM CO 30 E 42nd St, NY, NY RILEY MINE, Red House, Potosi dist, Humboldt Ca, undargd, surface, WO3 Mine Engr: Harry Trollope

WALKER CORP
Box 162, E Ely
Pres: B T Walker
YP: W J Walker
Sec: B T Walker
WARD MINE, 17 mi S of Ely (off
Ploche Huy), undergd, Ag. Pb, Cu
Under devel

WELCH, HUBERT 1738 Sparks Bt, Sparks WELCH FLUORSPAR MINE, Adaven, 60 mi W of Pioche, undergé, CaFg Ucdar drvei

WEST COAST SILICA CO Box 150, Overton MOAPA MINE, Overton, placer, silion eand

WETHERM, C A Box 175, Mina DOUGLAS, MARY ANN, PORTUNA MRHS, 8 mi SW of Mina, surface & undergd, Au, Ag Woder stevel

WIRREMUCCA MT MINES CO Box M, Wionematon Pres: OR Manula Pr. Wm D Craft Gon Mgr & Purch Agt: Owe Rogers REXALL, OGLD HILL, STAR, TUNGSTEN MINES, 3 ml N of Wissemsch, undergd, 190-4 49-TON GRAV MILL, concentration Asst Supt: Wm D Craft YUBA DIKE MINES, INC Flocks Pres: John A Hedman VP: Allan Quetafson Gen Mgr: Alexander Lloyd Sec: F L Heidenreich MINE, Ploche, undergd, Pe, Ze, Ag, Mn Under devel

NEW MEXICO

ALLIED CHEM & DYE CORP,
GEN CHEM DIVISION
BOX 631, Deming
May, Mng Oper: Robert H Dickson
Asst Mgr, Mng Oper: Wilbert J
Trepp
Met: G H Maxanin
DEMING MINES, 80 mi from
Deming, undergd, CaP2
Prod: 50 tons
Supt: Mike Scheriff
Fareman: Charles Gardass
100-TON FLOT MILL, Deming
Foreman: F Fauliner
(See Colo, Central, South & East)

AMERICAN SMELTING &
REFINING CO.
SOUTHWESTERN DIVISION
813 Valley Nat'l Bank Bidg,
Tucson, Arisona
Mgr: T A Snedden
Ch Geol: Kenyon Richard
GROUND HOG UNIT, Vanadium,
New Mex, undergd, Pb, Zn
Supt: W C Waidler
DEMING MLG UNIT, 800-ton
flot pl
Supt: H W Kaanta
Liffs
(See Aris, Colo, Calif, Idaho, Mo,
Mont, Okla, Utah, Wash & East)

ATWOOD COPPER MINES
Box 636, Lordsburg
Mgr: Ira L Mosely
ATWOOD MINE, 3 ml S of Lordsburg,
undergd, Cu, Au, Ag, Fb

BANNER MINING CO
2042 Conner, Tuccon, Ariz
Pres: H 1 Grimes
VP & Gen Mgr: E B Bowman,
Stravenue, Tuccon, Ariz
Sec-Treas: W H Hardy
BANNER MINE, 4 mi S of Lordsburg,
Cu, Ag, Au
BONNEY-MANILA & MISER'S CHEST
MINES, Lordsburg
Foreman: Coleman Dunkerson
Engr: B W Venable
S00-TON PLOT MILL
Foreman: Geo Stone
Meti D M Reck
Prod: 6,000 tone per month

BLACK HAWK CONS MINES CO
735 N Water St, Milwoukee 2, Wise
Pres: If A Apple
Gen Mgr: Ira L Wright
Sec: E M Ehiter
HANOVER & LUCKY BILL GPB, 14
md E of Silver City, undergd,
Zn, Pb, Cu, Ag
Under devei

BUCKEYE MINES, INC
TOO Central Ave NE, Albuquerque
Pres A Cen Mgr: V F Foy
VF A Asst Mgr: R E Willie
Boe: W R Baxter
Geol: T E Smith
BUCKEYE MINE, 18 ml ME of
Magdalena, undergd, Cu, Ag, Au
Mine Supt: W V McOutre
Under devel

BURRO CHIEF MINES
Box 500, Deming
Press is E McCray
BLACK EAGLE MINE, Red Rock,
undergd, Ma
Under deval

CENTRAL MHG CO, INC Hatch Pres & Gen Mgr; Rufus C Little Sec. Gordon Herkenhoff Gen Supit: Ed Perry LinCON LODE, 1 ml N of Rincon, undergd, Mn Under devail DOOLEY BROS PUMICE, INC. 9
708 Tulane Dr. NE, Albuquerque
Pres: Gilbert L Dooley
VP: J R Dooley
See: Maggie Dooley
P! Supi: II H Williame
Tress: J Mac Dooley
MiNE, 20 mi from Domingo, Sandoval
Co, surface, placer, pumice, secria
Cap: 1,000 cu yde

DRUNZER & CASNER Box 307, Santa Rosa Press: R. & Casner Gen Mgr: Q M Casner STAUBER MINE, 15 mi SW of Santa Rosa, surface, Cu Prod: 209 time

DUVAL SULPHUR &
POTASH
BIO, Carlebad
Ree Mgr: W P Morris
Asst Ree Mgr: O E Atwood
Safety Engr: H L Shively
Supt, Maint & Constr: H A London
Purch Agt J R Smith
MINE, 21 mi E of Carlebad,
undergd, potash
Supt: J E Tong
Foreman: J J Gasparich
Ch Engr: B G Messar
FLOT MILL
Supt: G Atwood
Foreman: I B Phillipe

PLORDIA MANGANESE, INC
Box 951, Deming
Pres: E A Howard
VP: Laurence Hammond
Asst Gen Mgr: Joseph Basine
Geol: M Howard Milligan
MANGANESE VALLEY, Lune Co,
12 mi E of Deming, undergd, Ms
Asst Mine Supt & Engr: M Howard
Milligan

OENERAL PUMICE CORP
Box 1445, Santa Fe
Pres: R w Alley
VP: Samuel Wein
Gen Mgr: R w Alley, Jr
Sec. G J Endree
MiNE, 35 mi N of Santa Fe, surface,
pumice
Mine Supi: Pred w Brandee
300-TON PUMICE MILL. Santa Fe

GREAT LAKES CARBON CORP
BOX N, Socorro
VP, Perlite Div: D L Marlett
Oper Mgr: E A Harris
MINE, 4 mi W of Socorro, surface,
perlite
Supt: W D Stone
Foreman: Jerry Howell
MILL, Socorro
(See Colo, Calif, Nev, Ore & East)

HAILE MINES, INC,
NEW MEX OPER
BOX 37, Hillsboro
Proc: II S West
VP: W L Long
See: H S West, Jr
Mgr: James I Moore, Jr
LAKE VALLEY MINE, IS mi S of
Hillsboro, undergd & surface, Mn
Prod: 730 time
Mine Bapt: Roy W Tirey
300-TON HEAV-MED MILL, Igs
Mill Supic Clyde N Garman
Assay: L P Regotti

HANOSH MINES, INC Grants
Orants
Orants
Orants
Ores
Orants
Ores
Orants
Or

BAYSTACK MT DEVEL CO A BURRED OF BANTA FE RR CO 80 E Jackson Blvd, Chicago 4, Ill Pres: F G Gurley VP: R G Rydin Sec-Trees: C A Menninger Ch Mng Engr: T O Evano Gen Purch Agt: W Kelly HAYSTACK MT MINE, Previtt, 30 mi NW G IMTERNAT'L MINERALS & CHEMICALS CORP CArlabad 'POTASH MINES Mgr: G T Harley Aset Mgr: G T Harley Aset Mgr: G A Arend Purch Agt: J F Farrell Mine Supt: M W Kartchner Engr: H L Gardner Me Foreman: E A Chowning Poremen: W F Ecklund, C EWiley Met: H F Clark, Jr Elec: J W McCroskey Chem: LE DuPoot Prod: 750 tone (See Aris, Colo, III, Mont, S Dak, Wyo, Central, South & East)

KELLY MINE LEASE Magdalena MINE, Kelly, Magdalena, undergd, Ag. Pb, Zn Ldie (Leased to J D Torres)

KENNECOTT COPPER CORP,
CHINO MINES DIV
Hurlsy
Oen Mgr: Will Coodrich
Assi Cen Mgr: E A Slover
Assi Purch Agt: A L Burns
CHINO MINES, Santa Rits,
surface à undergd, Cu, Modg
Supt of Mines: G J Ballmer
Assi Supt: W E Herlenhoff
FLOT MILL, Hurley
Mill Supt: E A Schroer
Assi Supt: E A Schroer
Assi Supt: W J Akert
REVERS SMELTER, Hurley
Supt: W H Wisn
Assi Supt: W C Dew

KERR-MeGEE OIL IND, INC NAVAJO URANIUM DIV Shiprock Mgr, Mng & Mig: Clyde Caborn Mgr, Explor: G R Kennedy URANIUM PROCESSING PLANT (See Wyo)

KIRK'S PERLITE INDUST
Box 576, Lordsburg
Queer: Marsi II Kuykendall
AMMER PEARL MINE, 12 mi 8 of
Lordsburg, surface, perlite
Prod: 180 tone per mo

LAVA-PUMICE, INC
Box 307, Albuquerque
Pres: Wm Elichhorst
VP: Richard C Otto
Gen Mgr: James McCree
Sec: E D Otto
MINE, 10 mi # of Penn Blancs,
surface, pumice
Prod: 156 tens
409-TON MILL, San Domingo

LUCK MNO & CONST CO Box 29, Silver City Gen Supt: J Hutchins BOSTON HILL MINE, Grant Co, surface, Fe, Mn

MacDONALD & DOBSON Box RR, Magdalena Partners: JA MacDonald, W R. Dobson MITT MINE, 3 mt SE of Magdalena, undergd, Za, Cu, Fb, Ag

MAYS, WA
Curons
LiTTLE WONDER MINE, 19 mi W
of Corons, undergd, Pb, Cu, Ag
Under devel

METALS LTD OF MILL CANYON BOX Y, Magdalena Gen Mgr: Frank L Maher Geel: Segmour Thurmond, Jr MillE, 12 ml SW of Magdalena, undergd, Au, Ag, Cu, Pb, Zn, rare earth metals Frod: 15 tens 15-TON GRAV-FLOT MILL, Mill Canyon Mill Supt: O L Maher

MEX-TEX MINING CO San Astonio MINES, Hansonberg, Pb, barite MILL, near San Antonio

MOCKING BIRD MNG CO 204 E 2nd St. Portales Gen Mgr: Paul Richlings MOCKING BIRD MINE, 18 and 8 of Bingham, undergd & surface, Pb, Zn MOLYBDENUM CORP OF AMERICA

MERICA
Questa

Cen Mgr: A L Creslin

Cone Engr: O R Whitaker

MOLY MDIS, 7 mb E of Questa,
undergd, molybdanisa

Bupt: Jose Varela

Bob-TON FLOT MILL

Enbert Creel Supt: Robert Creek (See Calif, Colo & East)

NEW JERSEY ZINC CO, EMPIRE ZINC DIV Hanover Assi Supt: C C Snell MANOVER MINE, 14 mi NE of Silver City, Pb, Zn PLOT MILL (See Colo, Wis, South & East)

WEW MEXICO AGGREGATE

MEW MEXICO AGGREGATE
CO
146 W Olmoe, San Antonio, Tex
Pres: R M Shipman
VP & Engr: Wm K Mell, Jr
Gen Mgr: J C Carruthere
Mei & Geoi. D R Semmes
Elec Engr: W K Hall
Sec: J C Chipman
TWIM MTRM MINE, near Dec Moines,
undergd, curface scoria

NEW MEXICO COPPER CORP
Box 86, Carrizoso
Pres 6 Gen Mgr; C E Degner
VP; John J Keel
See: A D King
Cons Met: Cooper Shapley
Geol: C E Degner
Mine Foreman: G E King
CONQUEROR RIO TINTO MINES,
Il mi SW of Corone, Cu, Pb, Ag,
CaPg, Mo wulfenite
SURPRISE PARK MINES, Il mi SE
of Carrizoso, undergd, Cu, Ag, Pb
CaPg, Mo CaF₂, Mo FLOT-GRAV MILL Mill Foreman C L King

MEW MEXICO MINES, INC
Rti, Box 3, Santa Fe
Pres & Mine Supt. R C Little
VP: M M Hardin
Sec: JD Coggins
HOPEWELL OP, Hopewell, 18 mi
w of Tree Fiedras, undergd, Au, Ag,
Cu, Pb, Zn

NIMA MNG CO
Esst Vaughn
Pres: Glon Pool
VP: Li Smith
Sec: Nins V Soone
Gen Supt: Prank Hell
Purch Agt: Ted B Smith
MINE, Corone, 24 ml SE of Corons,
eurface, bemattle, Mn
305-TON MILL

ÖZARK-MAHÖNING CO, MNG DIV Box 449, Tulaa, Ohla WHITE EAGLE MERE, 3 mi NW of Deming, undergd, CaF₂ Mine Supt: Edward Fowell, Jr Frod: SC tube (See Colo, III), Ohla, & East)

PERU MINING CO PERU NINING CO
Box 300, Silver City
Prec: Morris Blumberg
VPA Gen Mgr: Joseph H Taylor
VP: L R Berkey
Asst Gen Mgr: JW Faust
Sec: J S Floarny MINE, 1 ml E
of Hanover, earf, Au, Ag, Cu, Pb, Za
Mine Foreman: Wallace Dow
J, 250-TON FLOT MILL, Deming
Mill Supt: S T McBee
Elie

PETACA PLACERS Priscs
Pres & Asst Gon Mgr; G J Slater
Pres & Asst Gon Mgr; Rose Martines
Eafety Engr: L Martines
MILLER, MARTINEZ PLACERS,
2 1/2 mi W of Petacs, columnite,
tantalits, memosite, timentie
Mine Supt: A Trujtlic
Asst Supt: J G Sanches
100-TON MILL, Petacs
Mill Supt: T Martines

PHELPS DODGE CORP Tyrone BURRO MT BRANCH Agt: John F Stock (See Ariz, Toxas & East)

PORTALES MINING CO 204 E Becond Bt, Portalee Gen Mgr: Paul Ridings Asst Gen Mgr: G G Blunk MINE, 5 ml 8 of Bingham, undergd & surface, Pb Mine Sents, John Vent Mine Supt: John Yout 450-TON GRAV MILL, San Antonio

POTASH CO OF AMERICA POTASH CO OF AMERIC Box 31, Carlabad Pres: G F Coope VP & Treas: F O Davis VP & Res Mgr: R G Haworth Staff Engr: T L Corey Geol: J B Cummings Plant Engr: R R Dabney Safety Engr: R O Billings Research Dir: E W Douglas Furch Agi: C E Bothwell MINE, 21 mi NE of Carlabad, undergé, potassium chloride miller, It mi NE of Carlebad, undergd, potassium chloride Mine Supt: R.R. Knáll Mine Foreman: Neil Juhois Ch Mine Engr: J Edmunds FLOT MILL Mill Supt: H N Clark Asst Mill Supt: H N Clark

SCHUNDLER & CO, INC, F E
504 Railroad St, Joliet, Ill
Pres: F E Schundler
VP: J C Kingsbury
Sec-Treas: L H Sprague
Gen Supt: Carl Schuls
NO AGUA MINE, 20 mi S of
Antonito, Cole in N New Mex,
ourface, perlite
Frod: 250 tuns
Mine Supt: M B Mickelsen
Mine Supt: M B Mickelsen
Mill Supt: M B Mickelsen
Mill Supt: M B Mickelsen
Mill Supt: M B Mickelsen

SHATTUCK DENN MNG
CORP, FLUORSPAR BR
BOX 1306, Albuquerque
Gen Mgr: Geo A Warner
Ch Clerk: William F Caley
Assay: Augustine Chavey
ZUNI MINE, Box 38, Grante,
18 mil 8 of Grants, undergel, CaFg
LOS LUNAS FLOT MILL
Fred: 100 tops of conners, 200 Prod: 100 tons of concen, 200 tons acid grade CaF₂ (See Ariz & East)

SIERRA MANGANESE MNG CO Box 813, Deming Pres: Oscar Abraham Pres: Oscar Abraham
VP: Mike Abraham
Gen Mge: J R Abraham
Sec: Fred Phillips
Gen Supi: Ernest Nickols
HILLSIDE MANGANESE MINE, 4 ml
E of Caballo Dam, Caballo, Mn
LUCKY GREENSPAR MINE, 11 NW
Of Demine, undered & article. CaFE of Deming, undergd & surface, CaFg Frod: 50 tons

SIXTY COPPER PROSPECT OP c/o S S Thurmond, Jr., Box 183, Magdelena
"SEXTY" PROSPECT, 10 mi W of
Magdelena, surface, Cu, Ag
Under devel

SKIDMORE MINING CO Non 176, Crants
Gen Mgr: T H Skidsmore
LAST CHANCE MINE, 30 mi NW of
Grants, undergd, U, V
Mine Foreman; Joe McCormick
LiserCikio.

SOUTHWEST POTASH CORP.
Box 472, Carlsbad
Gen Mgr: FH Stewart
Aust Gen Mgr: Wabrey Smith
Elec Engr: Dale L Schrader
Greoi: Reid Walirman
Purch Agit A H Kunkel
MINE, 26 mi NE of Carlsbad,
undered, sotash MINE, 28 mi NE of Carisba-undergd, potash Prod: 3,000 tons Mine Engr: Ira Herbert 3,000 TON FLOT MILL-Mill Supt: R M Durland Mill Foreman: Loos Small Ch Chemist: H S Kaplan User Easi

TAPOYA, PIDEL & DAVID Magonlena
JUANITA MINE, Au, Ag, Cu, Pb, Zn
(Leased from C C Catron)

TELLEZ, ARCADIO M Box 114, Hanover PEERLESS MINE, c/o Mre C B Monroe, Silver City, 1/4 mt E of Central, undergd, Pb, Zn, Au, Ag TORPEDO MINING CO OTAM PEDO MINING CO Organ Pres: A S Puiney, Jr VP: L B Bentley Sec: Edwin Mecham TOR PEDO, MEMPHIS & BTEFHENSON-BENNETT MINES, undergd, Ag. Cu, Pb Supt: J B Brown. Assay: L B Bentley Edie

U S POTASH CO U S POTASH CO Cariabad Res Mgr: N H Bruhn Asst Res Mgr: E H Miller Dir, Ind Rel: L H Jones Furch Agt: R D Schenck Geol: J PSmith MINE & REFINERY, 21 mi E ef Carisbad, potash Mine Supt: George Heaton Refin Supt: R H Mills

S SMELTING, REFINING MINING CO 6 MINING CO
Box 606, Bayard
Mgr: J T Lewis, Jr
MINES: Pb, Zn
456-TON FLOTATION MILL
Mill Supt: Paris V Brough

Idle (See Utah, Alaska, Ariz, & East)

VANADIUM CORP OF A MERICA
EAST NEW MEXICO MINE,
San Juan Co, U
(See Aris, Colo, Utah & East)

WHITE, DOUGLAS B
Box 601, Silver City
ZUNIGA MINES, W of Fierro,
surface, Cu
LEACHING PL Met: Louis Osme

WOOD MINING CO
617 Dakota St, S E, Albuquerque
Pres: Ray C Wood
BLACK JACK MINE, 3 mi S of Truth or Consequences, undergd, Min Under devel

OKLAHOMA

BECK MINING DIV, INC Box 408, Miami Pres & Gen Mgr: G W Beck III Sec-Treas: M F Beck BECK #1 GRAV FLOT MILL, 1 mi Prod: 600 tons, custom

BIG FOUR MINING CO MINE, Pb. Za

BINGHAM MINING CO Box 306, Picher Mgr: John Henderson MINES, Picher-Cardin, Zn, Pb

BIRTHDAY MINING CO MINE, Pb. Zn

BISHOP MINING CO Pisher MINE, Pb, Zn

BOB WHITE MINING CO Box 677, Miami Edla Ifee Centrail

BONNIE MINING CO MINE, Pb, Zn

BULL FROG MINING CO MINE, Pb, Za

BUNKY K MINING CO MINE, Pb, Za

. C W & S MILLING CO Box 877, Miami CLEANUP MILL on Slimes, Pb, Zn

CARDINAL MINING CO Quepaw MINES, Picher-Cardin area, Za, Pb Supt: C A Baker Idle

CONNELY & GONCE MINE, Picher, Zn, Pt Edie (See Central)

CONNOR INVESTMENT CO 329 Joplin St. Joplin Pres & Gen Mgr: Ralph L Nelsa VP: M O'Connor Sec: G A Wedleigh Lessor of Mine Claims

CONTACK MINING CO. INC 10 E Contral Ave, Miami Pres: Orville Moore VP & Gen Supt: Finis Bryan Sec & Gen Mgr: V W Sapp (See Central)

CORONADO MINES INC 306 Wright Bldg, Tulsa Pres: Milton Leon VP: S P Bowyer Sec-Treas. A F Bourne (See Arizona)

DRYER MINING CO Commerce SOUTH SIDE MINE, 3 mi E of Commerce, Bb, Zn Mgr: Jake Dryer Ellis

EAGLE PICHER CO, MINING & SMELTING DIV First Nat'l Bank Bidg, Miami Pres: T Spencer Shore VP, Dir, & Gen Mgr: O A Rockwell Compt. G H Walbert Compt. G H Walbert
Dir of Mines: J W Chandler
Dir of Mines: J W Chandler
Dir of Mines: E H Crabtres, Jr
Dir of Peres: E C Mabon
Dir of Ines: K E Kimmel
MINES, Tri-State Area, Za, Pb
Office Address: Cardin
Gen Mgr: H W Harrison
Gen Supt: S & Clarke
Mill Supt: Fred Phelps
WILSON, BLUE GOOSE, BUFFALO,
GOODEAGLE #3, GORDON, GRACE
WALKER, JOHN BEAVER, LOTTSON,
PIOKEE, SLIM JIM, SEE SAH 6
BUTTESHEE #2
CENTRAL GRAV-FLOT MILL, Cardin,
15, 000 loss 15,000 tone ZINC SMELTER, Henryetta Mgr: F G McCutcheon (See Central, Ill, Wisc, Aris, & Nev)

PEDERAL MNG & SMLTG CO, WHOLLY-OWNED SUBSID OF AMER SMELTG & REF CO GORDON MINE, Northside, Pb, Zn

(See Kans, Mo & Idaho)

GRACE JARRETT MINING CO Box 73, Picher Mgr: WA Childress Idla (See Kans)

GRAY MNG & DEVEL CO Cardin MINE, Pb, Ža Idle

H & S MINING CO MINE, Pb, Za

WARRIS MINING CO. INC BIARRIS MINING CO, INC FARMINGTON & LUCKY JENNY MINES, Undergd, Zn. Pb 960-TON GRAV-FLOT MILL, Hockerville Supt: A T Harris Aust Supt: Lymond Smith Foreman: Floyd Seat (See Central)

MANGAS MINING CO 315 1/2 Main St, Joplin Pres: Ruesell B Prince VP: Ben R Morris Sec: Barnett McCracken

MINING WORLD

DOBSOM 67 & 64 MINES, 2 ma E Picher, undergd, Zn, Po Frod: 120 tons Mine Bupti R B Prince Mine Foreman: Jack McDowell Eds.

MID-CENTURY MINING CO Box 308, Picher Owner: John Henderson BENDELARI MINE, Za, Pb

CZARK-MAHONING CO Tuisa Press: CO Anderson VP: JG Trewartha Cen Supt: R K Wisco Mot: R A Sperberg Ceol: AG Johnson Else Engr: R D Davis Purch Agi: JL Cadden (See Colo, III, N Mex, East)

ROANOKE MINING CO Box 366, Picher Pres & Gen Mgr: O K Tucker VF: C W ingram, Jr Sec: W A Brewer (See Central)

ST CLAIR LIME CO Oklahoma City MINES, Marble City, undergd, surface, high Ca limestone Under devel

8 S & C MINING CO Box 341, Picher Lilia (See Central)

SOONER MLG CO, INC Box 385, Picher Pres & Gen Mgr: LR Hill VP & Mill Supt: John Norman Sec-Tress: HO Gray SOONER TAILING MILL, 1/2 ms NE of Picher, 2,000-ton grave flot, Za, S

TIGER MINING CO
Box 366, Picher
Pres: H D Youngman
VP: C W Ingram, Jr
Sec: H E Saundere
Gen Mgr: O H Burns
Dibs
(See Central)

TONGAHA MINING CO
Box 386, Picher
Pres: Clarence A Miller
VP & Gen Mgr: O K Tucker
Sec: W A Brewer
KITTY MINE, 2 mi W of Picher,
undergd, Zn, Pb
, Prod: 150 tons
Mine Foreman: Leslie L Marcus

TUCK MINING CO
First State Bank, Picher
Free & Gon Mgr: O K Tucker
VP: Raiph Chamers
Sec: Albert Brewer
WILSON MINE, 2 mi SW of Picher,
undergd, Zn, pb
Under devel
Frod: 800 tons
Mine Foreman: Raymond Harper
Ells

U S GYPSUM CO Southard Works Mgr: L A Pursell MINE, Surface, gypsum (See III, Mich, Calif, Colo, Mont, Nev, Tex, Utah, South & East)

UNIVERSAL ATLAS
CEMENT CO.
100 Park Ave, New York 17,
New York
WATONGA MINE, Blaine Co,
Surface, gypsum

W L B MINING CO Picher MINE, Pb, Zn

W M & W MINING CO, INC BREWSTER-HUTTIG MINE, 1 1/2 mi W of Hockervile, undergd, Zn, Pb Prod: 250 thm Mine Foreman: Jess O Ditson (See Central)

WALTON & SONS Observe MINE, surface, gypsum WESAH MINING CO Owner & Mgr. Tom Kiser WESAH MINE, 1 mi W Cardin undergd, Pb, Zn Prod: 219 inns (See central)

WHISKBROOM MNG CO Ficher MINE, Pb, Za Idle

OREGON

ALCOA MINING CO
Box 109, Hillsboro
BAUXITE DEPOSITS, Columbia &
Washington Co
Under devel

ALICE MINE
c/o Mrs Lillith M Turck
Kiamath Falls
MINE, Sterling Cr dist, Jackson
Co, Au, Ag

AL SARENA MINING CO
Box 132, Trail
Pres & Gen Mgr: H P McDonald
VP: C C Huxford
Asst Gen Mgr & Elec: Engr: C R
McDonald
Gen Supt: F H Altland
BUZZARD MINE, 23 mi N of
Trail, undergd, Au, Ag, Fb, Zn
Prod: 100-125 tons
125-TON GRAV-FLOT MILL

ASHLAND MINING CO
835 N Main St, Ashland
Mgr: Dewey & Fred Van Curler
ASHLAND MINE, 8 mi NW of
Ashland, undergd, WO₃, Cr
CHROME RIDGE MINE, 80 mi
from Ashland, Cr
50-TON GRAV MILL
MATTERN MINE, 2 mi N of Ashland,
undergd, WO₃
Prod: 5-10 tons

BARRICK, M.P.
Rt 2, Jacksonville
HOT BISCUIT, NEW DEAL &
GOLD KING CLAIMS, Upper
Applegate dist, Jackson Co. Au, Ag

BARTELS BROS MNG CO
Cottage Grove
Press: Wm Bartele, Sr
Gen Mgr: Wm Bartels, Jr
Supt: F J Bartels
CHAMPION MINE, 14 mi SE of
Disston, undergd, Au, Ag, Cu, Pb, Za,
Fe
200-TON GRAV FLOT MILL

BIG POUR MINE, IMC Rt 2, Box 505, Grants Pass Pres: Newell Wright Sec-Treas: R W Gartlet GOLD PLACER, hydraulio Gen Mgr: J E Bartlett

BONANZA OIL & MINE CORP Sutherlin Pres: A L Albee See: A Miller Gen Mgr: Jack Beck Geol: Dr Lloyd Staples Safety Engr: George Pearce BONANZA MINE, 8 mi E of Sutherlin, undergd, Mg Prod: 50 tone Mine Supt: Burt Avery Mine Foreman: T W Bidwell, Sp 50-TON RETORT FURN Foreman: T W Bidwell, Sp

BRATCHER MINING CORP Rt 1, Box 17, Ashland Pres: L A Bratcher VP: R C Van Vleet BRATCHER MINE #1, 3 mi SW of Ashland, surface, WO₃ CRAV MILL Lite

BRISTOL SILICA CO Box 505, Rogue River Pres: Fayette i Bristol BRESTOL MINE, 5 mi E of Rogue River, curface, cilica Prodi: 200 tone Mine & Mill Supt: Rolland Jones Cons Engr: A O Bartell MILL, Rogue R, Cap: 100 tons

BUPPALO MINES
Grants
MINES, undergd, Au, Ag, Cu, Pb,
Zn
FLOT MILL
Supt: J P Jackson

CALAPOOIA & BLUE RIVER MILL & MMG CO 1865 Brook Lane, Corvallis Pres: Kenneth O Watkins VP: Jessic Rice Sec: Aubrey & Tuesing FOORMAN MUNE, 7 mi N of Blue River, undergd, Au, Pb, Zn Umler devel

CHROME KING MINE-Box 673, Grants Pass Oprs: Thompson & Cox MINE, near Grants Pass, Cd Mgr: Edward Cox

CLARK, CLEO C Sunny Valley GOFF MINE, Greenback dist, Josephine Co, placer, Au Idle

CORDERO MINING CO
131 University Ave, Palo Alto,
Californiae
HORSE HEAVEN MINE, Ashwood,
46 mt E of Madras, undergd, Hg
Supt: Frank E Lewie
ROAST MILL
(See Calif & Nevada)

CURL BOURNE MINES
Sumpler
Pres: CC Curi
COLUMBIA-TABOR FRACTION,
E & E & NORTH POLE MINES,
7 min N of Sumpter, undergd, Au, Ag
Foreman: Hel Bradley
100-TON FLOT MILL
1818

CURRANT CREEK MNG CO 124 W 2nd St, Prinaville VP: A D Amundson QUEEN OF OREGON MINE, 7 mi E of Ashwood, 8b Gen Mgr: Mike Dragich Under devel

DANT & RUSSELL, INC Dantore Div, Box 150, Maupin Pres: T E Dant LADY FRANCES MINE, 13 mi 8 of Maupin, surface, volcanic glass 120-TON GRAY MILL.

Dejanvier, Glenn Rt i, Box 337, Gold Hill Mine, 8 mi w of Gold Hill, surface & placer, hydraulic, Au, Ag

DUSTON, EARL
EOX 492, John Day
LAST CHANCE MINE, Canyon
dist, Grant Co,
Idle
MOHAWK MINE, Greenhorn dist,
Grant Co, Au

DYKE, J S 1710 Washington St, Baker CAROL JEAN PLACER, 37 mi W of Baker, Au, Zircon Under devel

EAST EAGLE MNG CO
Box 699, Baker
Press: OR Holderman
Sec-Treas: LaRoy Chadwell
Gen Mgr: Raleigh Chadwell
Supt: Robert Chadwell
EAST EAGLE MINE, 42 mi NE of
Baker, undergd, Au, Cu, Ag
60-TON GRAY-PLOT MILL

EICKEMEYER BROS
POST
MAURY MT QUICKSILVER MINE,
32 mi SE of Prineville, undergd, Hi
MAURY MT RETORT

FORREST QUEEN LOGGING & MINING CO RI, EOS 1179, Grants Page Pres: R W Sleight VP: Virginia Niederman Gen Mgr: E L Niedsrman FOREST QUEEN MINE, 7 mi N of Grants Pass, placer, Au Idle

CILLMORE & DeCHESNE 6008 40th Ave NE, Seattle 5, Wash BADGER, HOMESTAKE & GOLDEN GATE GROUPS, Sweanville, 90 mi S of Pandleton, Au, Ag Under devel

ORAVES CREEK MINE Gold Hill Ope: Donna M Munday MINE, Gravee Cr dist, Josephine Co, Au, Ag

GREAT LAKES CARDON CORP, DICALITE DIV TERRESSENS PLANT #8, surface, distomaceous earth Supi: JA Care (See Colo, Calif, Nev, New Mex & East)

GREY EAGLE MINE Baker Owner: Anthony Bradenthaler MINE, Virtue diet near Baker, 85, Au, WO3 Idle 18-TON FLOT MILL

HANNA COAL & ORE CO., ORE DIV, SUBSID M A HANNA CO Riddle MINE, Nickel Mt, Douglas Co Gen Mgr: E S Mollard Unöser deval (See M A Hanna Co, Central)

MANNA NICKEL SMELTING CO, SUBSID HANNA COAL & ORE CORP Ruddle Gen Mgr: ES Mollard* PI Mgr: EE Coleman PLANT, under constr

HELEMA MINES, INC
1965 Brooks Lane, Corvalis
Fres: Wm E Caldwell
VP: N M Lassen
Gen Mgr: KO Watkins
Sec: H E L Barton
HELEMA, OREDON-COLO & LEAD
CRYSTAL MINES, 14-10 mi 5E of
Disston, undergd, Au, Zo, Pb, Cu, Ag
(Leased to A F Hartman, Claude Nugent,
Ivan Norgaard & Durhem Bell, Kellogg, Ida)

HI'- POTENTIAL MINES
Main & River Sts. Cottage Grove
Owner: Ray E Nelson
UTOPIAN, SWEEPSTAKES & HIAWATHA
GROUPS, 35 mi SE of Cottage Grove,
undergd, Au, Ag, Cu, Fb, Zn
Under devel
5-TON AMAL MILL, Bohemia

HOLMAN, JR, WONDER MINE
1465 E Grange Grove Ave,
Pasadena 7, Calif
Pinra: W B Freeman, LaVern Twombley
WONDER MINE, 30 mi N of Selma, surface, Cr, Au
Under devel
80-TON GRAV MILL

INDEPENDENCE MINE Kerby Oper: D A Foster PLACER, Josephine Cr, Au

JUMP-OFF-JOE MINES
Box 434, Grants Pass
Owner: Frank Heath
MINE, 21 mi N of Grants Pass,
placer, Au
25-TON AMAL CONCEN

KETCHUM, JIM Kerby GROUND SLUICING, Au Bille

LEWIS PLACER
Galice,
Operator: Bud Lewis
ROCKY GULCH PLACER, 14
mi N of Merlin, placer, Au
Prod: 100-500 yds

Union
Operator: Alfred Croutes
MINE, Union County, Au

McCALED CHROME MINE Box 26, Selma Pres: R E McCaleb MINE, Cr Foreman: Jack Kelly MERGER MINING CO 1565 Brook Lane, Corvalla Pres: B W Udeil MERGER MINE, 6 mi H of Blue River, undergd, An Under devei

MERRICK, EMERSON 1432 E Main St, Medford GILSON PLACER, 20 mi SW of Medford, placor, Au, Ag Mis JAY BIRD MINE, 25 mi W of Jacksonville, undergd, 50

NOONDAY COPPER MINE
514 NW Second St. Grants Pace
Gen Mgr: Earle N Young
MINE, 32 ml & of Powers, undergil,
Cu, Au, Ag
Mine Foreman: Russell Taylor

MORTHWEST DEVELOPMENT 313 Pacific Bldg, Portland 4 PERLITE MINE

OREGON CHROME MINES, INC Box 475, Grants Pace MINE, Oak Flate, 15 mi NW of Salma, undergd, Cr (Lauxed to W & Robertson)

PAGE BRUSS 201 E 6th St. Prineville Geol: Frank E Lewis STRICKLAND BUTTE, 20 mi NE of Prineville, underpd, Hg Uhder sevei

PIEREN, WESLEY & EARL & SRUNSWICK, (MRS) 10040 Clarey Ave, Grante Pass LEIPOLD PLACER, 2 1/3 mi from Galice, Au HARRY SORDY PLACER, Galice, An Under devel

PIERSON, JOHN & GEORGE Susanville BEAR CREEK PLACER, undergd & placer, Au, Ag

PINE CREEK PLACER CO Hereford PLACER MINE, As

PORTLAND CONSOLIDATED 1017 7th St. Baker Owner: Frank R Klein MISSE, it mi SW of Granite, undergd, Pb, Ag, Zn, Au (Leased to Chas Sayco & Son)

POWDER RIVER DREDGING CO Sumpter SUMPTER VALLEY MINE, Sumpter diet, Baker Co. Au, Ag

QUEEN of BRONZE MNG & SMELTING CO
633 N 7th St, Grante Page
Pres: E H Waite
QUEEN of BRONZE MINE,
Josephine Co, Cu

QUICKSILVER SYNDICATE Blackbutte
Pross Pross Pross Pross
VP: D J Mills
Oes Mgr: F L Mills
BLACK BUTTE MINE, 17 mi S
of Cottage Grove, Ng

RAND, LANGDON Pros: Irving Rand Mannie & CATHERINE CLAIMS, 780, Au, W 20 CLAIMS at Homestead, adjoining iron Dyke Mine, Cu, Ag, Au

RASMUSSEN, C A Orestin LODE PLACER, 9 mi 8 of Greate, Au, Ag Under devel

ROBERTSON, W.S. & ASSOC Box 475, Grants Peas MUNICIPACE MUNIC, Lower Applepate Au, Ag REER WILL MINE, Jesuphine Co.

SCHLBEON PLACER Wolf Grank Sparetures Schleigh & Booth

SCHLEIGH PLACER, Wolf Creek, hydraulic, Au JASON MINE, Greenback dist, Josephine Co, Au Idle

SHAVELY, ORVILLE N
Rt 2, Box 35, Jacksonville
OLD FEDERAL MINE, Upper Applegate diet, Jackson Co, Au, Ag

SIX MILE CHROMITE CO Box 13, Selma Proc & Mill Supt: Jean W Pressler VP & Mine Supt: Roy Jackson MINE, Cr 50-TON CUSTOM MILL, 8 and NW of Swims on Str Mile Cr

SOURDOUGH CHROME MINE 400 NE Flint St. Grante Pass
Pros: Pay I Bristol
Gen Mgr: Ben Baher
MINE, 32 mi W of O'Brign, undergd, romite rod: 30 tons tine Supt: Clarence Feshman Mill Supt: Forest Bradford

STEWARD, HARRY Box 115, Wolf Creek M H DAVIS GROUP, Josephine Co.

TAKILMA DREDGING CO Box 15, Takilma Pres: Howard Beasley MINE. 1/3 mi N of Takilma,

TAR BABY MINING CO 528 Newhouse Bidg, Sais Lake TAR BABY MINING CO
528 Newhouse Bidg, Sais Lake
City, Utah
Pros: W E Caldwell
VP & Mgr. K O Walkins
Sec-Treas: B M Slucter
MUSICK MiNE, 16 mi SE of Disston,
under gd, Au, Cu, Ag, Pb, Zn
Under deveal

THOMPSON & COX
Box 672, Grante Pass
CHROME KING MINE, Cr
Gen Mgr. Edward Cos

TRICKEL ELECTRIC SERVICE 2010 Third St., Baker Onwer: C. J Trickel FRIDAY, BULL RUN, HOWARD CHROME & MULTIMETALS MINES, Baker Co., undergd & surface, Cr. Ba, Cu, Au 10 mi E of

TULARE, GEORGE Rt 2, Box 371, Cold Hill SYLVANITE MINE, 3 mt E of Gold Hill, undered CORPRAL G MINE, 6 mi N of Gold

UDELL & WATKINS 1545 Brock Lase, Corvallis
YANKEE GIRL MINE & GRUBSTAKE
MINES, 6 mi N of Blue River, underground, Au
Mile. PROFESSOR MINE, 16 mi SE of Disaton, undergd, Cu, Pb, Za

VICTORY MINE Gisadals
Operator: Leo D Baker
MINE, Green Mountain dist, Douglas

WATERMAN PLACER MINES Mitchell
Con Mgr: E O Waterman
Asst Con Mgr: Gilber Waterman
Sec: Raiph Waterman
SPANISH GULCH PLACER, 25 mi E of Mitchell, placer, Au, Pt, monasite on ROCK RIPFLE PLACER, 25 mi E of Mitchell, placer, Au, Pt, monasite ear HYDRAUL MILL

WATKINS, KENNETS O 1868 Brook Lane, Corvalle WARRHER MINE, Fb. Za SUNSET MINE, As. Cu, Fb. Za LEROY MINE, Cu, Fb. Za LEHMEN MINE, Andergh URD PMINES, undergh

SOUTH DAKOTA

ABINGDON POTTERIES, INC 501 N Main St, Abingdon, Ill VP: J M Lewis WHITE ELEPHANT & TOWNSITE MINES, near Custer, pegmatite internals Mgr: Henry Kautssch, Custer

AMERICAN COLLOID CO Belle Fourche
BELLE MINE, surface, bentonite
Supt: Edwin Busfield
BELLE MILL

BALD MYN MINING CO Trojan
Pres: O D Collis
Treas: W H Reides
Mgr: R J Stochr
Geol: P A Miller Mech Engr: L. P Trucano MINE, 6 mi W of Lead, undergd MINE, 6 ml W of Lead, undergd & surface, As, Ag Prod. 150 tons Mine Supt: J Lauritaen Mine Engr J Kiley TINTON DIV. VOLNEY MINE, Tinton, 15 ml W of Lead, surface, Prod: 70 tons
380-TON CYAN MILL
Mill Supt: R D Callo
Mill Foreman: B Ols
Assayer: W Harris

BELLE ELDRIDGE GOLD MINES
Box 437, Dendwood
Pres: Alfred Haug
Gen Mgr Carl Johnson
Sec-Tress: Ove E Ellefson
BELLE ELDRIDGE COLD MINES,
Au, Ag, Fb, Za
100-TON FLOT MILL
Under devid

BLACK HILLS KEYSTONE CORP Keystone Keystone Pres: W K Wallace Pres: W K Wallace INCERSOL MINE, beryl, lepidolite, mica, tantalite, feldspar SO-TON FLOT MILL Johanna

BLACK HILLS LIME COMPANY Pringle Mgr: Samuel A Kirk LIMESTONE QUARRY & KILN

BLACK HILLS TIN CO
333 8 Michigan Ave, Chicago, Ill
Proc: Ross J Beatty, Jr
VP: Jehn T Beatty
Sec: B A Brophy
MINE, Tinton, surface, spedumene,

BOBBINGTON, IRA Reystons PINE CREEK LOOE MINE,

BURGESS & REED Custer Operator: Joe Burgers SKY ROCKET MINE, 4-1/2 mi SE of Custer, pegmatite m

BURNSIDE, AMOS V Custer TRIANOLE A MINE, I mi SE of Custer, pegmatite minerals

BUTLER, CLAYTON Pringle RATTLESHAKE MINE, 5 mi 8 of Pringle, pegmainte minerale

CAMPELL, GRORGE, SR DAKOTA MINE, 15 mi SE of Custer,

CLIFFORD, E B Custer SMONEY MINE, Fegmatite minerals

COLLINGWOOD, DEAR ANN & BIG BLOWOUT MINES, near COLLINGWOOD, LEONARD C CHARLE JIM, RAY, ST LOUIS & RANBOW MINES, near Custor, pegmatite minerals

COLLINGWOOD, LEWIS Custer WHALE MINE, 19 mi SE of Custer, pegmatite minerals CHBLER MDE, near Custer, pegmatite minerals

COPPO, RAY SILVER QUEEN MINE, Ag, Au

DAKOTA TIN & GOLD CO Spearfish MINE, Pegmatite minerale

DUNCAN, LAWRENCE Custer MINE, sear Keystone, peganetite minerals

EVANS, ROBERT W Custer DIAMOND DICK, 8 ml SE of Cupter, pegmatite minerals

EDGEMONT MNG CO Edgemont
Operators: EJ Brockman &
Arthur Ledwig
GRASS FLAT & VIRGINIA C MINE,
near Edgemont, surface, uranium near Edgem (See Wyo)

PLUORSPAR DEVEL CO Desimond

Mgr: George W Wolf

MINE, Lawrence Co, CaF₂

PRERICHS MINING CO
Box 352, Deadwood
Pros & Gen Mgr: D A Prerichs
Sec-Treas: F J Parker
PRERICHS MINE, 1-1/2 ms SW of
Deadwood, Au, Ag
Under devel

PROZEN POOT MINE Custer Leased by Frank Bandy of Brodu Mont & R H Riley of Lead, 8 Dek Pegmatite minerals

BAZLETINE, LLOYD Keystone KEYSTONE-ELECTORN MINE,

HOFFMAN, JAMES L LAST CHANCE MINE, 18 mi SZ of Custer pegmatite minerals

HOLY TERROR MNG CO Egysions
Sec: George Flavin
Gen Supt: A I Johnson
HOLY TERROR MINE, undergd &
surf, spedumene, beryl, mass, colu-Pred: 100 tons 100-TON FLOT MILL

HOMESTAKE MINING CO

OMESTAKE MINING CO
100 Bush St, San Francisco 4
California
Pres: Donald H McLaughlia
VP: Guy N Bjorge
VP & Treas: Archibald A Owlich
VP: James W Swent
Sec. John W Hamilton
Res Sec: Wm W Murray
HOMESTAKE MINE, Lead, undergs, NOMESTARE MINE, Lead, wasseys, Ass.

1, 209, 884 time, per year Prof.

1, 209, 884 time, per year Adol-TON CYANIDE MILL.

Gen Mgr: Abboth H Shoemsser Mine Supt: W C Campbell Ch Kervig Asst Mine Supt: W C Campbell Ch Met. Richarder Hers Asst Ch Met: C E Schwidel Ch Gool: Same O Harder Ch Engr: J D Johnson Ch Elec Engr: C L Guet Ch Mech Engr: D L Graves Ch Councel: Kenneth C Keller Purch Agt: F E Bryan YATES COMPRESSOR PL, MINE A CYAN SAND PLS 15 & 3, load (Bee Wyo & Utah)

NUPP, WALTER MNE, pegmatite minerals

MINING WORLD

INTERNAT'L MIN & CHEM CORP PETERSON, HOWARD L Bow 451, Belle Pourchs Mgr: K L Arthur MINE, 30 mi # of Belle Fourchs surface, bentonit Prod: 1,000 tons 500-TON MILL CONS PELDSPAR DIV MINE & MILL. CONS FELDSPAR BY MINE & MILL Evystome, feldspar Supt: J W Mitchell MINE, Custer, feldspar EU-TOH ORIHBING MILL Supt: R B Brigham (See Aris, Coto, Mont, New Miss, Wyo, Ill, Central, South & East)

JOHNSON, A I & G R JURISCH Exystens PONCA MINE, pegmatite minerals

LITHIUM CORP OF AMERICA Rand Tower, Minneapolis, Mine Pres: K M Leute WHITE CAP & EDISON MINES, & MATEEN HILL CITY, Box 62, Rapid City, near Keystone, pagmatite minarals, spodumene Mgr: Fremont Clarke

LIVINGSTON URANIUM CORP URANIUM MINES, near Edgement

MAYWOOD CHEM WORKS Hunter Ave, Maywood, New Jersey ETTA MINE, Keystone, spodumene Mgra Dewey Peterson

McROBBIE, ROBERT Custer
DALMON MINE, pegmatite minerals

MICHAUD & STRATTON Coater BORSESBOW LODE MINE,

MID-CONTINENT EXPLOR CO MINE, Black Hills, rare earths, Mn, CaF2, WO3, & others () (See Wyo)

MINERALS MILLS, INC. Custer Pres: Aftert Gueburet See & Gen Mgr: A I Johnson OLD MIKE & GLENWOOD MINES, 4 ml NW of Custer, undergd & swf, mica, beryl, feldspar, tantaiste Prod. 100 tons 100-TOM CRIMBING & SCREENING PL, at Old Mike Mine

MONARCH MINES, INC C C NELSON - ANN & PITZGERALD, APPLETON & CROWN, PENDLETON & PUNCH, near Custer, pegmatite

MOST NEVMPHIEUS MINE MINE, pegmatite minerals

NATL LEAD CO. BAROID SALES DIV Beile Fourthe BENTONITE PITS ot: DKR Engr: C G Scott See Calif, Nev, Tex, Mo, & Central)

NUNEZ, HENRY J Custer RAY MINE, 7 mi SW of Custer, pegmatite m

PARKER, CLANCY Custor
DTHER PROMPECT MINE
PULMAN #2 & #4 MINES
WILDWOOD MINE, near Custer,
pegmatite minerale

PATTERSON, CLAIR Keyetous MINE, pegmatite minerale

PEARSON, DALE SKY ROCKET MINE, 7 ml SE of Custer, pegmatite minerals

PENDLETON, JACK, JR MINE, 6 mi E of Keyetone,

GOLD STAR MINE, mear Keystone,

PHELPS, JOHN Custar MDE, pegmatite mis

ROSEBERRY & MARSIN Custer REDBIRD MINE, 20 mi SE of

ROSEBERRY, CARL TOPSITE MINE, 3-1/2 mi SE of Custer, pegmatite minerals HUB MINE, 4 mi SE of Custer,

ROSEBERRY, JOHN PARK MINE, 4-1/2 mi N of Custor, pegmatite minerale MEEKER MINE, 10 mi NE of Custer, pegmatite minerals
TRIANGLE MINE, 5 mi SE of Custer,
pegmatite minerals

ROSS, JOHN HIGHLAND LODE MINE,

SAGDALENE, BALDWIN Keystone
PINE CR LODE & WHITECAP MINE,
Newstone, pegmatite minerals

SCOTT'S ROSE QUARTZ CO Custer
Mgr: Frank S Scott
RED ROSE & MGUNTAIN ROSE
MINES, near Custer, pegmatite

SEARS, LAWRENCE A MINE, pegmatite minerals

SHINDELBOWER, . HENRY Custer WINTEER WAYSIDE MINE, 5 ml 2

SODAK MINING CO
Box 33, Edgemont
Gen Mgr: Clyde Boyle
COAL CANYON MINE, sear Edgemont, surface dranium ROAD HOG & RICH HUNNER MINES, near Edge

SOLOM, B L Custer MINE: VICTORY #1, 8 mi NE of Custer, pegmatite minerals

SOUTHERN HILLS MINES, INC Keystone Pres: Ed Schilling Mgr: A I Johnson JUNIPER MINE, Keystone, Au, Ag

SPILDE, NORMAN Custer
BLUE BONNET & STAR PELDSPAR
MINES, 4-1/2 mi 5E of Custer,
surface, pegmátite minerals

SPRING, KENNETH Custer MINE, pegmatite minerals

STRATTON, LEWIS MINE, pegmatite minerals

TILLOTSON, OTTO & LINN ELECTION MINE, near Custer, pegmatite minerals

WEIHE, CARL MINE, pegmatite minerals

WELLS, GLADYS MINE, pogmatite minerals

WOOD, ERNEST Box 2, Keystone ANNA LODE, GLENDALE #1, #2, #3 4#4 & CRACKER JACK, 7 mi SE of

WRIGHT, W W Custer MINE, Custer Co

ZIOLKOWSKI, KORCZAK CRAZY HORSE & FROZEN FOOT MINE, Custer Co, pegmatite minerale

TEXAS

AMERICAN SMELTING & AMERICAN SMELTING &
REVINING CO
Box Illi, El Paso
Mgr. 8W Dopt: Ben D Roberts
Aset Mgr. R E Shinkoekey
Mech Engr: J W English
Safely Engr: R E Redman
RETORT SMELTER, Amarillo, Ze RETORT SMELTER, Amarillo, Za Prod: 86, 500 tone per year Mgr: E J Bruderlin EL PASO SMELTING WORKS, 3 mi N of El Paso, Fb, Cu smelting & converting, Za furning Prod: 30, 000 tone per year REFINERY, Corpus Christi, elec Zu Prod: 30, 000 tone per year Mgr: C N Waterman Gee Aris, Colo, Calif, Idaho, III, Ment New Mex, Okla, Utah, Wash, Central & East)

AMER ZINC CO OF ILLINOIS, SUBSID OF AMER ZINC, LEAD & SMLG CO Box 577, Dumas VP & Gen Mgr: R A Young MACHOVEC SMELTER, Za Bus Mgr: WERSmith
Purch Agt: WG Hollifield
(See Amer Zinc-III, III; Amer ZincTenn, South; Amer ZL&S, Mo, Okla,
Wash)

BENNETT-CLARK CO, INC. Nacogdoches Pree: G F Clark MINE, surface, bleaching clays

CERTAIN-TEED PROD CORP Mines, undergd, gypsum (See Mich, Utah, Central & East)

DUVAL SULPHUR & POTASH

CO
Esperson Bidg, Houston 2
Pres: Geo F Zoffman
VP & Treas: Eugene German
Sec: V J Thornhill
Gen hgg: W P Morris
Purch Agi: J R Smith
ORCHARD MINE, 2 mi SE of Orchard, Gen Supt: JO Tyree (See New Mexico)

ESPERADO MINING CO Box 1037, Houston MINE, Brewster Co, Hg

PREEPORT SULPHUR CO
161 E 42nd St, New York 17, NY
Div Magr: B A Axelrad
SULPHUR MINE, Nash Dome
SULPHUR MINE. Hoeking Mound
(See South & East)

JEFFERSON LAKE SULPHUR CO 1408 Whitney Bldg, New Orleans 12, La CLEMONS DIME MINE, Brasoria Co, Texas, S LONG 19 AT DOME, Fort Bend Co, S Line South)

LONE STAR STEEL CO LONE STAR STEEL CO
Box 8087, Daliae
Pres: E B Germany
Exec VP: W H Johnson
VP, Oper: W R Bond
VP, Research: LG Graper
Met: E S Elkann
Elec Engr: L W Bramlett
VP, Empl-pub Reis: L D Webster
VP, Sales: W T Moreland
Sec: E S Greer
Asst, VP Oper: T M Hart
Geol: John Jord
Mech Engr: L J Hoffman
Safety Engr: Sam Deasley
Purch Dir; John Morris
Worke Engr: D B Hooser

LONE STAR MINES, BLACK MTN LONE STAR MINES, BLAC.
A RODGERS, ourface, Fe
Prod: 10,000 nat tons
Div Supt: W L Kendrick
Mine Supt: M J Hughes
10,000-TON GRAV MILL.
Mill Supt: A C Melting
BLAST FURNACE
Capacity: 1,200 tons daily
Supt: F O Stark
Aset Supt: S G Anderson

MILWHITE COMPANY
Box 15036, Houston
Pres: Max B Miller, Jr
Exec VP: P A Frank
VP: A B Willie
PRODUCERS of bleaching clays,
meeticide, diluents, barite,
mainstin & take

TILLIE BADU MOSS Llano MINE, 12 mi NE of Llano, surface, feldspar Idla

NATIONAL GYPSUM CO QUARRY & PLANT, Rolan, surface, gypsum Prod: 800 tons Mine Supt: T W Smith Plant Mgr: J E Irwin (See Central, Mich, Sou (See Car uth & East)

HATIONAL LEAD CO, BAROID SALES DIV 2404 Danville St, Houston 6 Gen Mgr: G L Ratcliffe Assi Gen Mgrs: G B Coale & J W Holtsutter Prod Mgr: Reginald Roward CORPUS CHRISTI PL, barite, dry CORPUS CHRIST PL, Barite, dry grinding mill Middleton HOUSTON PL, Bentonite, barite, dry grinding mill, oil well chem Supt: R J Penrose MULDOON MINE, Muldoon, bentonite, spen pit
Supt: H J Penrose
TEXARKANA Pl., Texarkana, eil
well chem, dry grinding
Supt: J A Smith
(See Calif, Mo, Nev, Yez, Wyo,
Central & East)

MATIONAL LEAD CO, TEXAS MINING & SMELTING DIV Box 559, Laredo Mgr: JC Archibaid, Jr Asst Compt: Claude Noton Ch Chem: Fidel Gonzales REVERB & BLAST FURNACES, FUMING PL, Highway BI, N Laredo Plant Supt: R L Kulpaca (See Calif, S Dak, Nev, Wyo, Central & East)

PECOS ORLA SULPHUR CO. INC Orla Pres & Gen Mgr: P L Meath, 703 Franklin St, Houston MICHIGAN CLAIMS in Gris, surface Mine & Mill Supt: S C S Lewis Prod: 1,500 tons

PHELPS DODGE REFINING CORP, SUBSID OF PHELPS DODGE CORP DODGE CORP
Box 1872, El Paso
Pres: Welter C Bennett
Exec VP: C 5 Harloff
VPs: Cleveland E Dodge,
Heward Barkeli
Sec & Councel: Julian B Beaty
Compt: Raymond Sodes
Treas: M Urquhart
Asat Treasurers: H R Dobbs,
R D Berduart Assi Trassuere: H R Dobbo, KD Barrinart ELEC COPPER BEFINERY, COPPER SULPHATE FLANT, also NISO₄, Se Te, & ZesCo₄ Prod: 240,000 tons per year Works Mgr: E W Donahue

SOUTHWESTERN GRAPHITE CO Burnet
Pres: George W Clemeon
VP: Robert P Miller, Sr
VP & Gen Mgr: R P Miller, Jr
Sec-Trees: G Miller
Supt: G E Hilliard
MINE, il mi NW of Burnet, surface, graphite Prod: 289 tons Mine Foreman: Pete Bibles Ch Engr: D C Peacock 366-TON FLOT MILL

GOUTHWESTERN PORTLAND CEMENT CO 613 El Paco Natl Bank Bldg, El Paco GYPSUM QUARRY, Hudepeth Co

SOUTHWESTERN TALC CORP Box 245, Liano
Pres & Gen May: Bertram Browne
VP & Geol: J B Upton
Gen Supt: C T Pollard
ROSSMAN MINE, 25 rel E el Sterra
Blanca, evríace, tale
Mine Supt: J E Stafford
DAVIS MUSE, 32 mi SE el Liano,
euríace, tale
Mine Supt: P C Mayes
200-TON PULVER MILLI, Llano
Mill Supt: C T Pollard
Foremen: Carl Owne, J Hurtado

TEXAS GULF SULPHUR CO Newguif, Tex BOLING DIME MINE, Newguif, S MOSS BLUFF MINE, Liberty, S SPINDLETOP MINE, Beaumont, S

TIN PROCESSING CORP
Box 1431, Texas City
Ch of Boi: E Warfield
Pres & Gen Mgr: A L Braske
VP: H F van der Lasn
Asst Gen Mgr: J R Winn
Gen Supt: J W Boyle
Purch Agt: A J McSain
Supt Smelter: W L Follett
Supt Experimental Dept: B B Wesver
Ch Chem: H H WHILE
Acts Supt, Rosesting & Leaching:
R G Swift
Supt, Maint: B T Looper
Supt, Ore Storage: M L Walker
Supt, Wants B T Looper
Supt, Ore Storage: M L Walker
Supt, Waste Actd Disposal: R H Owens
LONGHORN REVERB SMELTER, Se
Prod: 80,000,000 be of Sn

UNITED STATES GYPSUM CO MINE at New Braufole, Tex, eurlace, lineatone TWO MINES at Sweetwater, Tex, gypsum (See Calif, Colo, Mont, New, Utah, Central, South & East)

UTAH

ALICE MNG CO
Mush
Pres: Ed Rodgere
VP: Frank Richardson
Sec-Treas; T C Hudson
URANIUM-VANADIUM PROP

ALTA-HELENA M & M CO Sex 323, Sandy Oper: Francis Coupens MINE, Alta-Helena Co, 17 mi E of Sandy, undergd, Ag, Cu

AMERICAN FORK
CONS MINES
505 Deply Bidg, Salt Lake City I
Fres: If G Biunenthal
VP: N J Nielsen
Sec-Trezs: W J Robertson
Gen Sup: Lesite O Burnett
BLUE ROCK MINE, 20 mt NE of
Pleasant Grove, undergd, Ag, Pb
Linder General

AMERICAN GILSONITE CO
134 West Broadway, Sait Lake City
Pree: E F Goodner
Sec & Purch Agt: E H Owen
MINE, Bonanta, giteonite
Supt: John It Baker
Aust Supt: F Williams
Frod: 280 bns

AMERICAN METAL MNG CO BISW Temple St, Bait Lake City Pres & Gen Mgr; C S Woodward VP. Ben R Hall Sen: Louise M Orton Gen Supt: Frank Yanchar Gen! Rag E Marcell AMERICAN METAL MINE, 35 mt E of Midvale, undergd, Au, Ag, Pb, Cu, Za Jáis

AMERICAN SMELTING &
REFINING CO, UTAH DEPT
TOO Poelife Nat'l Life Bidg.
Ball Lake City 1
SMELTING DEFT
Gen Mgr. West Dept: E McL Tritmann
Figr: W G Routliard

Ore Buyer: C R Fish
Furch Agt: A R Worthen
In Chg, HighOg & Liquid SOg:
R D Williams
OARFIELD COPPER SMELTER,
Garfield
Supt: R Thompson
Asst Supt: E V Hardy
MINNERS DEFF
Gen Mgr, West Dept, F V Richard
Ch Geol: W R Landwehr
Milling Engr: N Weise
Milling Gagr: N Weise
Milling Giden Color & diamend
drilling
(New Men, Venh, Ill & East)
New Men, Wesh, Ill & East)

ANCIENT RIVER CHANNELS
GOLD MNG CO
Sutt 1, Cornet Bidg, Las Vegas, Nev
Pres: Thomas H Berry
VP & See: Wm T Berry
Gen Supt: Res F Smith
Geol: Dr F W Christianen
MINERAL HILLS MINE, Maryavale,
2 ms NE of Maryavale, U
Under devel

APEX & LIBERTY BELL Owner: Skoro Conz M & M Co Seci Domaid & Swim 501 Jeffereon St, Boise, Ida MINE, Box Elder Co, Au, Ag, Po

ARTESE & JOHNSON
Enterprise
CLAIMS, 0 mi S of Enterprise,
surface, Fe
Under devel

BEAVER CREEK MNG CO a/o Emil Ostlund, Springville UTAH SILVER, LUCKY STRIKE & CHUCK GROUPS (EAST PARK), 6 mi E of Kansas, undergd, Ag. Po like

BLACKHAWK NO 1 143 W Cottage Ave, Sandy Opere: C J & A J Collett MINE, Bluebell dist, Po

BORNITE #1, 2, 3, 4 & ...
MEADOW PLOWER
Owner: Ophelis keCo y
2857 North Ave, Grand Junction,
Colo
Opers: Rny Yeager & Georgs
S Michener
MiNES, Grand Co, Ag, Cu
Idie

BLUE STAR MMG CO
Beaver
Pres: Lory Free
Sec: Ed Lowenson
MINE & 50-TON MILL, near
Beaver, WO3

BONNEVILLE, LTD

540 W 7th South St,
Sait Lake City 4
Pres: W L Bradley
Gen Mgr. L W Feerls
Purch Agt: W R Thomas
MINE, Wendover, KC1
1, 000-TON FLOT MILL
Mine & Mill Supt: B B Lamus
Acst Mine & Mill Supt: Jesse Ecton
Mill Foreman: Rands Wiley
Mice: Foreman: Nands Wiley
Mice: Foreman: Nands Wiley
Met: D C Hunter
Assay: Clyds Andrew

THE BRUSH BERYLLIUM CO
4301 Peritins Ave, Cleveland 3,
Ohio
Pres: BK Towson
VP: H W Schaffner
VP: N W Base
VP: C W Schwensfeier
Tres: D H Hershberger
Geol: Kormsn C Williams
Purch Agt: R W Cobb
EXPLORATION, Jush & Toeele Ce's
Sheep Rock dist, Be

BULLION MONARCH MNG CO, INC 216 Utah Oti Bidg, Sait Lake City Pree & Gen Mgr. Arch M Wackerli VP: Rose Corbett Sec: Robert N Cooper Gool: Joseph Beeson BULLION MONARCH MINE, Maryevale, 5 ml NE of Maryevale, undergd & surface, U Prod: 20 tons Under Sevel (Leased to Atherley Bros)

CALERA MRG CO, SUBSID HOWE SOUND CO Garfield Supt: WR McCormick Ch Acet: WE Taylor CHEM REDUC PL, Cu, Co (See Calera, Idah); Howe Sound, Winns & Earl

CANNON PROPERTIES Struckton Oper: Willis Smith MiNE, Zn, Pb

CAL URANIUM COMPANY
Music
Pres: Albert B Ruddock
VPs; Merritt K Ruddock &
Billings K Ruddock
Esci. Edward D Neuhelf
Con Suist: Frank A McCary
Field Engr: Robt B Daniel
Con Geol & Engr: John Hill
MINE: SAN JUAN SHAPT, 35 mi
SE of Moah, underge, uranium
Prod: 100 tone per day
Mine Foreman; Earl Haldeman

CARDIFF MNG & MLG CO
TO Newhouse Bidg, Salt Lake City
Pres & Gen Mgs: L E Stein
VP: M Richards
Sec-Treas: R A Glenny
CARDIFF MINE, near Alta,
undergd, Au, Ag, PD, Zn
Supt: A G Kolovos
Este

CERTAIN - TEED PROD CORP Sigurd GYPSUM MINE (See East, Mich, Tex & Central)

CHIEF CONS MNG CO
808 Dooley Bidg, Sait Leke City
Pres: Cecil Fitch
VF à Gen Mgr: Cacil Fitch, Jr
Sec: Ww Watson
CHIEF #1, GEMBN, EUREKA HILL,
PLUTUS & EAST CROWN POINT CONS
MINES, Box 280, Eureka, shaft, Fb,
Zn, Ag, Au
Prod: 440 tons
Ch Cli: M Carter
Lime Pf Foremen: R E Steele
Ch Elec: A D Baker
hast Mech: Sid Tregachis
Geol: Max Evans
Engr: J H Pitts
Foreman: L W Brady

COLORADO CONS MINES CO
Ill4 Walker Bank Bidg,
Salt Lake City
Pres: H E Raddatz
VP: Harriet D Travis
Sec: Gein Hardy
Gen Mgr: M D Paine
COLORADO CONSOLIDATED
MINE, Dividend, 2 mi SE of
Eureka, undergd, Pb, Au, Ag, Cu

COLORADO FUEL & IRON CORP Cedar City BLOWOUT, COMSTOCK & DUNCAN MINES, Surface, Fe Res Engr: R L Wahl (See Colo, Wyo)

COLUMBIA IRON MNG CO
SUBSID U S STEEL CORP
Ruse Bldg, San Francisco, CalifPres: A G Roach
VP: L 5 Dahl
See: Thomas Ashby
Gen Supt: O D MacDonald
Mgr, Raw Mat Devel: R C Talbott
Ch Engr: W F Pruden
Dir, Empl Rel & Safety: C T Spivey
Dir of Purch: H W Christensen
MINES, Iron Mn & Desert Mound,
30 ms W ef Cedar City, surface, Fe
Gen Mine Supt: G D MacDonald
Mine Engr: G B Standifird
CRUSHING & SCREENING PLANTS,
Devert Mixed & Iron Min
(See U S Steel, Mont, Ush, Lake
Superior, East & South)

COMBINED METALS
REDUCTION CO
Box 180, Salt Lake City 10
Press: E H Snyder
VPs; Otto Herree, W H Kelsey
Sec: C M Christeneen
Gen Mgr: E H Snyder
Gen Supt: S E Creats (Bauer)
Gen Supt: S B Areats (Flocky)
Geol: Eat I B Young

Met: H A Dawson Elec Engr: J M Ridges Mech Engr: A J Schindler Purch Agt: E G Black (See Newsda)

COMMONWEALTH LEAD MRG CO 424 Feit Bidg, Sait Lake City I Press & Cen Mgr: JF Featherstone VP: R B Garff Bee: Dean R Featherstone Geoi: R E Marsell CALVIN MINE, 7 mi E of Meirose, undergd, Pb, Ag COMMODORE MINE, 10 mi SE of Stockton, undergd, Pb, Ag, Cu, Zn Geoi: R E Marsell Under devel

CONSOL EUREKA MNG CO 132 S Main St, Salt Lake City I Pres: James E Hogle VP: JC Johnson Sec: L J Lerwill ISSE Newsdai

CONS URANIUM MINES, INC
521 Feit Bidg, Salt Lake City
Pres & Gen Mgr: E G Frawley
VP: Roy A Hardy
Gen Supt: Wesley Moulton
Purch Agt: Wayne J Walker
TEMPLE MT MINE, 48 ml SW of
Greenriver, undergd, U, V
Prod: 175 tons
MUDDY RIVER CLAIMS, 30 mi from
Temple Mth, U, V
Under devel
(See Colo)

CONTINENTAL URANIUM, INC
BOX 608, Grand Junction, Colo
Pres: Harold J Roses
VP & Gen Mgr: Jack O Jones
Sec: Max H Braun
Geol: Harold M Smithson
MINE: 58 mi 5E of Moab, undergd,
U, V
Unden devel

CUPRIC MINES CO
39 Exchange Place, Selt Lake City
Pres: P H Hunt
CACTUS a CUPRIC MINES,
Millord, surface, Cu
isile

DEER TRAIL MINES
Marywale
Pres & Gen Mgr: John W Wilhelm
VP: IN Febr
Sec: Dwight L King
Gen Supt: Jay G Sylvester
DEER TRAIL, VALDASKC, TRINITY &
RAINBOW MINES, near Marywale,
undergd, Ag, Au, Pb, Cu, Zn
Under devel, producing

DIXIE-APEX MINE
Owner: Emerald L Cox
139 South 100 East,
St George
Opers: Apex Mng Co &
Kentucky-Utah Mng Co
MINE, Tutagubet dist, Wash
Co, Ag, Pb, Cu
Under devel

DRAGON CONS MNG CO
Eurckia
Pres: F A Wardlaw, Je
VP: J J Lillie
Sec: Rom Warburton
Gen Supt: J F Dugan
Geol: M S Kildale
Purch Agt: T K Davis
DRAGON MINE, 4 mi S of
Eurcka, undergd & surface,
halloysite cilay
Prod: 200 toos
Mine Supt: L A Ryan
Mine Engr: R C Thomas

DYKE MINE Owner: C E Crafte, Hinckley Oper: L J Price MINE, Junk Co, Ag, Pb

EMMA MINE
Owner: Ray Rosebrough
1761 South 5th East St,
Salt Lake City
Oper: N W Kalmar, Lehi
BINE, Juab Co, Ag, Pb
Bir

EUREKA LILLY CONS MNG CO 1114 Walker Bank Bldg, Sait Lake City I Pres: HE Raddats VP. Harriet D. France Sec: Gien Hardy Gen Mgr; M D Paine EUREKA LILLY MINE, Dividend, undergd, Au, Ag, Cu, Pb

EUREKA STANDARD CONS MNG CO 1114 Walker Bank Bldg, Salt Lake City 1 Pres: H E Recidats
VP: Marriet D Travie
Sec: Glen Hardy
Gen Mgc: M D Paine
MINE, EUREKA STANDARD, near
Dividend, Ab, Ag, Cu, Pb
Litis Pres: H E Raciata Idla

FOUR CORNERS URANIUM (Subsid of Silver Bell Mines Co)
Supt; William N Binder
Properties, near Cisco, Orand Co,
U,V

PRISCO SILVER LEAD MNG CO PRISCO SILVER LEAD MNG G 39 Exchange Place, Salt Lake City l Proc: Paul H Hunt See: David H Bullough MINE, 25 mi W of Milford, undergd Idle

GARPIELD CHEMICAL CO 750-TON SULPHURIC ACID PLANT Plant Supt: P H Hutchinson

GRAMLICH MINERALS, INC. Pres & Gen Mgr: John W Gramlich, Sr VP & Asst Gen Mgr: John W Gramlich,

Sec: Philip F Gramlich Geol: Norman Ebbley VANURA MINE, Green River, 15 mi W of Green River, undergd & surface, U,

Under devel, producing (See Colorado)

HAMPTON MINING CO Box 24, Stockton Pres: M Chamberlain Sec. Stanfurd B Manuney ARGENT MINE, 3 ms E of Stockton, undergd, Pb, Zn, Au, Ag Prod: 8 tons

HOMESTAKE MINING CO 100 Bush St, San Francisco 4, Calif LITTLE BEAVER MINE, Grand Co. Gen Mgr: Paul Henshaw (See S Dak & Wyo)

HORN SILVER MINES CO 39 Exchange Place, Salt Lake City Pres: P H Hunt Sec-Treas: D H Bullough HORN SILVER MINE, Milford, Au, Ag, Pb, Zn (Leased to Metal Producers, Inc)

HOWELL MINING CO
529 Newhouse Bldg, Salt Lake City
Pres: Rich Whitmore
Sec: B B Hall Gen Mgr: H E Havenor YELLOW CANARIE CLAIMS, near Marysvale, U, Under devel

IBEX GOLD MINING CO Sec: Loon Newton
IBEX, KEYSTONE, MARRITE,
E P H & ALTO MINES, 35 mi NW of
Delta, undergd, Cu, Au
Effe Box 37, Provo Pres: J Wm Knight

INDEX-DALEY MINES CO 21 SW Temple St, Salt Lake City Pres & Gen Mgr: Charles S Woodward VP: Glen A Finlayson Sec: R W Edmunds DALEY MINE, Mountain Home 24 mi NE of Mountain Home Mine Foreman: George A Rich Exploration

INTERNATI SMLTG & REP CO, A SUBSID OF ANACONDA COPPER MNG CO GUPPER MNG CO 818 Kearns Bldg, Salt Leke City Gen Mgr, Utah Oper: FA Wardiaw, 3r Mng Supt: J F Dugan Met Mgr: B L Sackett, Purch Agt: T K Davis

MILL & SMELTERS near Tooule Gen Supt: Carlos Bardwell Mech Engr: R E Long Safety Engr: T K Voyer Ch Chem: H T Goodjohn 0-TON FLOT MILL, Internat'l, Zn, concentrate Prod: 10,000 tons per year Supt: R V Kettner Supt: R V Kettner
Met: George Kontello
SMELTER & REFINERY, Internat'l
Prod: 85,000,000 lbs Pb per year
8,000,000 lbs Cu per year
40,000,000 lbs sinc oxide &
sulphide per year

KENNECOTT COPPER CORP, UTAH COPPER DIVISION BOX 1690, Sait Lake City 10 Gen Mgr, West bing Div: JP Caulfield Gen Mgr, Utah Copper Div: L F

Gen Mgr. West hing Div: J P
Caulifield
Gen Mgr. JUah Copper Div: L F
Pett
Asst Gen Mgr: F C Green
Asst to Gen Mgr: F C Green
Dir Ind Rel: D C Houston
Dir Ind Rel: D C Houston
Dir Lab Rel: J A Norden, Jr
Dir Fub Rel: N W Aldrich
Div Compt: J F O'Keefe
Asst to Div Compt: L J Farrer
Adm Accnt: O C Massen
Ch Mini Acct: C R Brooks
Storekeeper Mills: J W Ridd
Storekeeper Mills: J W Ridd
Storekeeper Mills: J W Ridd
Storekeeper Mills: J Boberg
Ch Refinery Acct: H L Erickson
Ch Engr: G A Parker
Mast Mech Mills: L Baldee
Trafic Mgr: F B Merrill
Central Power Station, Garfield
Ch Engr: H PLEARly
MILLS ORE HAULAGE, Garfield
Supt: L S Hills
SINCHAM MINE. Binsham Cannon MILLS ORE HAULAGE, Garfield
Supt: L S Hills
BINGHAM MINE, Bingham Canyon
Gen Supt: J C Landenberger, Jr
Mine Supt: V,5 Barlow
Gen Mine Foreman: E C Simkins
Empl Dir: L O Hamlin
Safety Engr: G W Knudsen
MAGNA SELEC PLOT MILL GARTHINS SELEC FOR MILL GARTHINS SELECT FOR MILL GARTHINS SELECT FOR MILL GARTHINS SELECT FOR MILL GARTHINS SELECT FOR MILL GARTHING SELECT Saicy Engr: O w Anusem
MAGNA SELEC FLOT MILL &
ARTHUR SELEC FLOT MILL, Garfield
Gen Supt: PH Ensign
Supt, Magna: John Allan
Asst Supt, Magna: T Barker, Jr
Supt, Arthur: C G Quigley
Asst Supt, Arthur: P M Barton
Emploir: M A Moffat
Ch Elec Engr: R J Corfield
Safety Engr: R L Corfield
Safety Engr: R L Erickson
Ch Anal Chem: Y A Fraser
UTAH REFINERY, Garfield
Supt: H A Shaw
Asst Supt: K H Koropp
Mat Engr: C A Zeldiury
Mast Meci: C A Salisbury
Mast Meci: R F Johnson
GARPIELD WATER CO & GARFIELD
IMPROVEMENT CO, Garfield

KING DAVID MINING CO 30 Exchange Place, Salt Lake City Pres: P H Hunt Sec-Treas: D H Bullough KING DAVID MINE, Milford, Ag, Cu, Pb, Zn

KING MANGANESE CORP MINE, 35 mi E of Kanab in Kane Idle

KING OF THE WEST MINE
915 Continental Bank Bidg,
Sait Lake City
Owner: Lawrence Fox
MINE, 30 ml W of Kwichum, Ida,
undergd, Pb, Zn, Ag
Liia

LA SAL MNG & DEVEL CO Moab Pres: H H Mundy VP: Frank Richardson Sec-Treas: T C Hudson PATSY CLAIM, San Juan Co, U, V

LEAD PRINCE
162 So 8th East, Salt Lake City
Owner: Royal Ute M Co
Sec-Treas: A R W Hintse
LEAD PRINCE MINE, Tooele Co, Ag, Pb Idle

LISBON URANIUM CORP son Continental Bank Bidg Sait Lake City Pres: HD Landes, Jr VP: Eric C Ryberg Sec-Trees: E R Dumks, Jr EXPLORATION: Big Indian Dist, U, V

LITTLE BEAVER MNG CO Musb
Pres: W T Hudson
Gen Mgr: Bob Barrett
LITTLE BEAVER MINE, 38 mi SB of Moab, undergd, U.V

LOTTIE R GROUP Owner: Wm B Allinson, Eureka MINE, Tooele Co, Ag, Pb

MCFARLAND & HULLINGER Bon 238, Tooele HIDDEN TREASURE MINE, Ophir dist, Zn, Pb, Cu ONTARIO DUMP, Summit Co, Au, Ag, Pb Supt: K L Erickson, Box 588, Park City (See Ariz)

METAL PRODUCERS INC METAL PRODUCERS INC
Millerel
Pres: G W Clemson
VP: Otis Burch
Sec-Treas: R M Landrum
HORN SILVER MINE, 18 mi w of
Milford, undergd, Pp. Zn, Ag, Au
Prod: 100 tons
Gen Mgr: D C Peacock
Gen Supt: J P Lowe
Foreman: Tony Lerotich
400-TON FLOT MILL, 4 mi w ef
Milford
Supt: R V Thompson
Foreman: Geo Bush
Intie

MORENO-CRIPPLE CR CORP
405 Interestate Trust Bidg,
Denver 2, Colo
Pres & Gen Mgr: R A Bennett
VP: H W Balsley
PROPERTIES, Mosb, U Under devel

tole

THE MGSS COPPER MNG CO
Box III, No 8 W Center St, Provo
Pres: Carl J Harris
VP & Gen Mgr: Joseph Hafen Sec: Leon Newren BiG INDIAN COPPER MINE, 10 mi S of La Sei, undergd, uranium

MT VIEW MINING CO MT VIEW MINING CO
821 Kearns Bldg,
Salt Lake City
Sec: Rom Warburton
MT VIEW GROUP, Utah Co,
Ag, Au, Pb, Zn
Idie

NEW ECLIPSE, LUCKY NEW ECLIPSE, LUCKY
THREE #1, 2
Owners: Walter W Smith, Vergil
C Fox, Gerald E Detar & Alex
M Steward
Soil Highland Dr, Salt Lake City
MINES, Tooele Co, Ag, Fb

NEW PARK MINING CO NEW PARK MINING CO
903 Walker Bank Bldg,
Sait Lake City
Pres: W H H Cranmer
VP & Gen Mgr: Clark L Wilson
Sec: Robert L Cranmer
Geol: Walter E Bauer
Mech Engr: B L Berry
Assayer: H P Walch
Purch Agi. Carl D Harper
MINE, undergd, Au, Ag. Cu, Pb, Zn
Asat Mine Supit: George Cloward
Mine Foreman; Wm A Mair
Bine Engr: F A Kuhimaa

NORTH LILLY MINING CO 820 Nearns Bdig, Salt Lake City Sec-Treas: Rom Warburton NORTH LILY MINE, Utah Co, Pb, Ze Idle
TINTIC BULLION MINE, Utah Co,
Zn, Pb, Au, Ag

OK LEAD MINE Owner: W.L. Dewitt, Mona MINE, Juab Co, Ag, Pb Elle

OPHIR DEVELOP CO Ophir Pres & Mgr: D C Gilbert MinE, Ophir, Cu, Fb, Zn, Ag Under devel (Leased to U S Smelting, Refining & lang Co)

PAGE MINE Owner: Duke Page, Spanish Fork Oper: D J Garrick, 440 S 6th East, Provs MINE, Juab Co. Ag. Pb

PLATEAU MNG CO Supt: Melvin C Bowles YELLOW CIRCLE MINE, 13 mi E of Moab, U Under devel

PLUMBIC MINES CO
39 Exchange Bldg, Salt Lake City
Pres: P H Hunt
Sec: D H Bullough Mgr: J G Sargent JEEPSTER MINE, Marysvale, undergd, U PROPERTIES, Beaver Co. Pb. Zn

PRIVATEER MINING CO PRIVATEER MEATHOC Box III, Provo Pres: C C Jenkins Soc: Leon Newren EVA MINE, 5 mi E of Mona, undergd, Pb, Zo, Ag Idle

PROSPER MINING CO Pres & Gen Mgr: A M Bealer VP: John Van Dyke Gen Supt: L. B Chulski Gen Supt: L B Chuleki
OLD HICKORY HARDROCK MINE,
surface, Au, Ag, Cu, W. Fe
Supt: Gotfrid Peterson
Engr: Karl Hutchins
Under devel
100-TON FLOT MILL Assay: Dearson & Nichols

RAINBOW GOLD MINES CORP OF DELAWARE Maryevale Pres: Louis C Deluke COPPER BELT MINE, Piute Co, Au, Ag, Cu

RARE METALS MINING CO Sait Lake City HOUSE RANGE MINE, 50 mi SW of Delta, WO₃ 300-TON MILL, under construc

RAVEN MNG CO OF UTAH Hosecveli
Pres & Gen Mgr: F C Ferron
VP & Gen Supt: R A Ferron
PARIETTE MINE, 12 mt S of Myton
undergd, gilsonite
Foreman: Raiph McMullin
E B MINE, 45 mt SE of Vernal, undergd, gilsonite Foreman: Richard O'Neil

REALTY COMPANY, THE 937 Nati Bank Bldg, Denver B, Colorado Pres: Chandler Weaver VP & Gen Mgr: Ray A Bennett Sec: L D Allen LUCKY STRIKE MINES, 61-610 Henry Mine, Garfield Co, undergd, U, V Prod: 26 tons Supt: Herold Ekker (See Colorado)

RED CANYON MINES Owner: Red Canyon Minse Partnership, Donaid T Adams, Preston Redd, Ozro Hunt, & J Wiley Redd, Partners Monticello, Utah MHES, San Juan County, uranium Under devel

SAN PRANCISCO CHEM CO ARICKEREE MINE, NE of Randolpi phosphate rock Supt: John S Wright (See Ida & Wyo)

SAN JUAN URANIUM EXPLOR Mean PAULT CLAIMS, Yellow Circle dist, near Moab, U, V

SALT LAKE TUNGSTEN CO, SALT LAKE TUNGSTES CO, THE 2160 Indiana Ave, Sait Lake City Press Blair Burweit VP: E C Larsen See & Treas: JE McGarr Directors: E G Sullivan & Leon J Chine Mgr: M NSaw Met: Allen Burweit TUNGSTEN REFINERT, "Symhetic Echeelise"

SILVER HORN MINING CO 1024 let Ave, Balt Lake City I Pree: Wil Sprunt Gen Mgr: L B Glafeke MINE, undergd, surface, Au, Ag Cu, Ph

A R SIMPLOT CO, INC Pocatello, Idaho Gen Mgr: George McHugh MINE, Temple Mtn dist, Wayne & Garfield Counties, uranju Under devel

SIOUX, DUNYS
1114 Walker Bank Bldg,
Salt Lake City
Owner: Steam Mines Co
Auditor: Glen Hardy
SIOUX MINES, Utah Co, Au, Ag

STANDARD URANIUM CORP Pros: Joseph W Fraser PROPERTIES, Sen Juan Co, Big Indian dist, U

STAR DUST MINES, INC 536 Atlas Bidg, Salt Lake City Pres & Gen Mgr: Fred Cook YP: Blake Probert Sec: F L Maxwell STAR DUST MINE, near Gold Hill sundared. undergd, WO₃
34-TON GRAVITY MILL, Bapah

SUNNYSIDE URANIUM CO Marysvale Gen Mgr: Lane J Bertelsen BUDDY MINE, 8 mi NE of Marysvale, undergd, U Prod: 10 mes

SCHEHINE MINE Deita Owners: R J Law & Frank Law SUNSHINE MINE, Millard Co, G

THREE STATES URANIUM

CORP 354 Main St, Grand Junction, Cole LONG SHOT GROUP, BLUE BIRD GP, LUCKY CECIL, Garfield Co, U, V Wader devel Under devel JIMMY BOY GROUP, San Juan Co. Under devel

(See Colo)

TIMCO URANIUM, INC
538 Attao Bidg, Salt Lake City
Pres: C A Schettler
VP: L D Gardner
Sec-Treas: F L Maxwell
URANIUM PROPERTIES, San Juan Co TUNGSTEN PROPERTIES,

TINTIC LEAD CO 39 Exchange Place, Sait Lake City Pres: P II Hunt Sec-Treas: D H Bullough MINE, Milford, Au, Ag. Po (Lessed)

TINTIC STANDARD MNG CO City Pres: H E Raddata Pres; H E Radhau
VP: Roy M Jacobe
Oen Mgr; M D Paine
See: Glen Hardy
TINYE: STANDARD UION BLOSSOM
MERS, Divideed, underge, Aw/Ag
Cu, Pb, CaP
COUGAR MINE, 36 ml NW of Lond,
undergel, Pb, Ag, Cu, An, CaP
2112

TREASURE HILL MINES CO 510 Folt Bidg, Salt Lake City Pros: Dan T Moyle VP: Dr Dean K Christensen Sec & Gen Mgr: G Dwight Wakefield Gen Supt: Frank D Sayler TREASURE HILL MINE, 9 mi SE of Stockson, Ab, Ag, Cu, Pb Dillo

TUSHAR GROUP (SHAMROCK) 934 Harrison Ave, Redwood City, California
Owner: The Tusher Mines, Inc
Pres: C E Sherman
Oper: R A Glenny, Tot Howhouse,
Sait Lake City
TIBMAR OR OWNER SHOWNER Sait Lake City TUSHAR GROUP MINE, Pluts Co, Ag, Co

UNITED MINERALS CORP 518 Feit Bidg, Seit Labe City Pres & Gen Mgr: G W Snyder Jr VPs: G W Snyder, H A Covey & H C Grion Sec: Guy Synder Purch Agt: M Dishl Gedi: M C Godbe III Ch Engr: H A Cover Ch Engr: H A Covey (See Aris, Idaho & Nev listings)

UNITED MINING & DEVEL CO Salt Lake City
Pres: O H Evens
IDA, DESERT VIEW, BLACKJACK
MINES & SIMPSON MT MINES,
Erickson dist, Au, Ag, Pb, Ze, Mn, Cd Supt: Jack Moree 56-TON GRAV MILL

UNITED PARK CITY MINES CO SIO Kearns Bidg, Salt Lake City Press: John M Wellace VP: Prank A Wardlaw, Jr Sec: J Wm Sicoser Res Mgr: S K Drosbay MINES Consolidation of Park Utah Cone Mines Co & Silver King Coalition Mines Co Cone mines Co & Silver King Coalition Mines Co PARK CITY, DALY & ONTARIO MINES 3 mi SE & SW of Park City, undergd, Pb. Ag. Za SILVER KING MINE, Park City, undergd, Au. Ag. Cu, Pb. Za

UNITED STATES GYPSUM CO GYPSUM MINE, Nephl, underge GYPSUM MINE, Sigurd, surface (Sec Calif, Celo, Meon, Nev. Tex, Lake Sup, Central, South & East)

UNITED STATES SMELTING REPINING & MINING CO WENTERN OPERATIONS Newhouse Bidg (BOX 1989), Salt Lake City 10 VP & Gon Mgr, West Oper: W C Fage Asst Gon Mgr, West Oper: O A Asst to VP & Gen Mgr, West Oper; B E Grunt Mgr, West Mines: A G Kirkland Aset to Mgr, West Mines: Max M Bulbets
Mgr, Midvale Pl: H L Johnson
VP & Ch Geol: R N Hunt
Indus Devel Dir: J M Ehrhorn
Indus Devel Engr: Boris Ashur
Consul Mill Met: R A Fallanch Boris Ashurkeff Consul Mill Met: R A Pallanch UTAN GPENATIONS US & LARK MINE, Bingham dist, Pb, Zn, Cu Gen Supt, US & Lark Mines: Benton Boyd Supt, U S Sec: John Holmes Supt, Lark See: Harold Wells MIDVALE PL, FLOT MILL & LEAD SMEL. Gen Supt: C A Nelson Mill Supt: A A Nelson (See Alaska, Aris, New Mex & Esati

East

URANIUM CORP Pres: Reads W Brinton PROPERTIES, 25 mi Bill Monticello, U, V Under devei

URANIUM, INC
T30 Waiter Book Bidg,
Balt Leise City
Pros: Jamoo J Farley
VF: Win Essadekia
See & Treass Kay L, Roth
BIRCU CREEK AREA, 3 1/2 mi
NW of Torrey
INDIAN CREEK GROUP, See
June Co. ROYAL PURPLE Group, Sevier Under devel

U S STEEL COMPANY COLUMBIA-GENEVA DIV Ruse Bidg, San Francisco, Ca VP & Mgr: L J Weethaver Gen Supt: L F Black BLAST FURNACE, Geneva, nea thes Minn. Mich. South & East)

U S URANIUM CORP

414 Darling Bidg, Salt Lake City
Près: E M Ladiow
Supi: Levis Stilson
Geot: 18 K Thurbor
PROPERTIES, Temple Mi Diet,
Zmery Co. U.V
Under devei

UTAH MINE COMPANY UTAH MINE COMPANY
47 E So Temple St, Salt Lake City
Pres: Benry D Moyle
Sec: Joseph L Wirthlin
UTAH MINE GROUP, Fish Springs
diet, SW of Salt Lake City, undergd
Ag, Pb, Au
Elis
(Leased to John E Fritch, Park City)

UTEX EXPLOR CO, INC Box 432, Moab Pres: Charles A Steen VP; W T Biddem Sec: Mitchell Mellen Gen Supt: Virgit Bilyes Geol: Charles A Steen, G Plus Geol: Charles A Steen,
G P Dix
Met: Clem Chass
Off Mgr: Robs Fellmeth
Mi VIDA MINE, 38 mi SE of Mosb,
undergd, U, V
Prod: 400 tons,
Mine Supt: Virgil Bilyeu
Mins Foreman: Oren Moore
Assay: Laures Ball
Under devel

VANADIUM CORP OF AMER Maryevale Gen Mgr: D W Viles, Durango, PROSPECTOR & PREEDOM MINES. PROSPECTOR & FREEDOM MINES, Marywale, undergd, U Mine Bupt: R L Anderson Asst Mine Supt: Wm Witmeyer MINES, White Canyon near Hite Supt: J A Maxwell PILOT PLANT, White Canyon, Cu, U Supt: Leroy Parker & East) (See Aris, Colo, New Max & East)

VICTOR CONS MINING CO 820 Kearns Bldg, Sait Lake City Sec-Treas: Rom Warburion VICTOR GROUP, Just Co, Au, Ag

VITRO CHEMICAL CO VITRO CHEMICAL CO
600 W 33 St, Salt Lake City
Pres: Y C Ward
Exec VP: O White, 3r.
Exec VP: G White, 3r.
Exec W H Denne
Gen Supt: M Ellis
Geolt R E Wimber
Met: J D Moore
Mech Engr: R E Miller
Purch Agit: C A Theobald
URANIUM-VANADUM
HYDROMETALLUNGETAL PL

WEST PARK MINING CO WEST PARK MINING CO Box III, Provo Pres: J H Petersen VP: O W Johnson Gen Mgr: A H Scott Sec & Purch Agt: Leon Newren WEST PARK MINE, 3 md S of Brighton & 5 mt NV of Midway, undergé, Cu, Au, Ag Prod: 5 tons Mine Supt: A M Scott Under devel

WEST UTAH 936 South 7th East, Sait Lake City Owner: Earl T Milham WEST UTAH MINE, Josh Co, Ag, Po

WESTERN GOLD & URANIUM, INC.
42 Broadway, New York 4, N Y Pres: Raiph O Brown VP: David F Sharra Sec: Berner Backus Gen Supt: Harris B Salasbury Geol: Richard V Wyman BLVER REEF MINE, 2 mi NW of Leeds, undergd, U, V Under devel

WESTERN GYPSUM CO 314 Dooly Bidg, Sait Lake City Pres: 5 H Eliason VP: W S Mole MINE: WESTERN GYPSUM, Siguro, eurface, gypeum Prod: 400 tone Mine Supt: Ed Flinn

WHITE CANYON URANIUM CO. WHITE CANYON URANIUM CO MINE,

YANKEE CONS MINING CO 621 Kearns Bldg, Salt Lake City Sec-Treas: Rom Warburton YANKEE MINE, Utah Co, Au, Ag, Cu, Pb, Za

WASHINGTON

AAVESTRUD & WELLER Box 385, Coulee City KELLY CAMP MINE, Ferry Ce, WO3 Under devel

ADMIRAL CONSOL MNG CO 400 American Legion Bidg. Spokane
Fres: O L Hood
VP: J L S Bennett
Sec: WC Hawes
MINE, 1 mi N of Leadpoint, undergd,
Zo, Pb, Ag
16-TON FLOT MILL

AGRO MINERALS, INC Tunaskei Pres & Gen Mgr: R W Cool VP & Asst Gen Mgr: Dan A Coe Sec: H L Cool POISON LAKE MINE, 8 mt NW of

ALDER GOLD COPPER CO ALDER GOLD COPPER C 405 Redity Bldg, Spokane Prest E Royce VP: J. L Magney Sec: B K Magney Sec: B K Magney ALDER MINE, Twisp, undergd, Au, Cu, Zn Frod: 300 toma Mgr: Harvey F Stone Mine Supt: Earl M Cooper 300-TON PLOT MILL Met: F A Sharp

AMERICAN GRAPHITE METALS Box 123, Yakima Pres: A E Patnod Pres: A E Patnode
Gen Mgr: E R Thoma
Supt: F B Satterles
MiNE, 4 mi NE of Omak, flake.
graphite, Pb, Zn, Ag, Ni
100-TON GRAV FLOT MILL, Omak
(Lessees: Kaiser-Wagner-Oison
Partnership, Concountly)

AMER SMLTG & REF CO AMER SMLTG A REF CO VAN STOME MINE, Box 89 Colville, surface, Za, Fb Bupt. P A Lewis Mine Foreman: Frank Paparich Mine Engr: Ralph Stave Ch Clerk: George Mond Asst Clerk: Fred Harding 1,000-PLOT MILL Mill Supt: Robt A Blakes Aast Mill Supt: R K McCallum ABBUPT: Wilson Tooke TACOMA SMELTER, Box 1805, Tacoma, copper smelter, TACOMA SMELTER, non Mero, Tacoma, copper smeller, electrolytic refinery, arsenic refinery a acid pi Gen Mgr: E R Marble Asst Mgr: G E Sigler Gen Supt: P T Benson. Purch Agt: J F Vogel Kee Aris, Cole, Calif, Idaho, Ili, Mo, Mont, New Mex, Utah, Centra & Essti

AMER ZINC, LEAD & SMELTING CO 927 Old Nati Sank Bidg, Fpokuns Western Mgr: D I Hayee Gen Supt: John W Currie LEAD & Meti. Deion Underwood
West Geol: H F Mills
Elec Engr: R A Skeman
Purch Agt: R F Tharp
GRANDVIEW MINE, Metaline Falls,
undergd, Pb, Zn
Prod: 835 tons
Mine Supt: C L Sage
Mine Foreman: Otts Hagberg
Asst Mine Foreman: Clarence Sage
Mine Engr: Theodore Becker
Master Mech: Roy B Gilbert
635-TON FLOT MILL
Mill Supt: Homer P March
(See Amer Zinc-Ill; Amer Zinc-Tenn,
Amer Zinc, Mo, Ill & Texas)

BEAR CREEK MNG CO (Kennecott Copper Co) 181 E 42nd St, New York 17, NY NORTHWEST DIST, 713 Peyton Bidg, Spekase Dist Geol: Lowell B Moon (See Calif, Minn, Wash, South, & East)

BIG DOME MINING CO 401 12th Avenue N, Seattle Pres: Oscar Johnson MINE, Kittitas Co, Cu

BONONZA MINE MINE, 16 mi N of Colville, undergd, Pb

BONANZA LEAD CO
Bix III, Colville
Owners: E B Glibbs, I M Hunley
BONANZA MINE, Stevens Co, Pb, Ag
YOUNG AMERICA MINE, Stevens Co,
Bossburg dist, Zn, Pb, Ag
COYOTE MINE, Stevens Co, Cu, Ag,
Au

CASCADE MINING CO, INC 11704 Phinney Avenue, Seattle Pres & Gen Mgr: Henry E Trenk VF: Arthur Beckier Sec: DeWitt Barkell ACES-UP MINE, 8 mi SW of Skykomish, undergd, Ag, Pb Under devei

CHEWALAH COPPER CO
Chewalah
Pres & Gen Mgr: Gordon La Vigne
VP: E P Maher
See: Philip Sisois
Gen Supt: W Moorhead
Geoi: Wn Hoggatt
CHEWELAH COPPER MINE,
4-1/2 mn Ne of Chewelah,
undergd, Ag, Cu, Au
Prod: 150 tons anticipated

CONSOL MINES & SMELTING
CO. LTD
Box 86, Kenmore
Pres: Hugh Brown
Sec-Tress: D N Gellatly
THREE PROPERTIES at Keller,
Ferry Co, undergrd & surface, Cu, Mo
Under devel

DEER TRAIL MINES
Fruitland
Owners: Three Peaks Corp,
Sait Lake City, Utah
Oper: James W Lower
DEER TRAIL, TOGO-TURK, LUCKY
BOY MINES, Fruitland, Cu, Pb, Ag,
barite
Under devel

GERMANIA CONSOL MINES, INC. 401 Empire State Bidg, Spokane 1 Pres: Julius A Franz VP & Gen Mgr: Henry Franz Sec-Treas: E I Flaber Gen Supt: H W Traver GERMANIA CONSOL MINE, 15 mi from Hunters, undergrd, WOg Prod: 25 tons 25-TON GRAV-PLOT MILL

GLADSTONE MT MNG CO 202 Radio Central Bidg, Spekam Lessee: W L Clearwaters Pree: JS Ramsge VP & Mgr: W J Nicholla Sec-Tress: K M Nicholla GLADSTONE MINE at Leadpoint, Pb, Ag

GODFREY, JOHN & ELMER & YOCUM, ERRIE Northport Gen Migr: John Godfrey LEAD KING MINE, 20 mi E of Northport, undergrd & surface, Pb Prod: 5 tons Under devel GOLDFIELD CONSOL
MINES CO
Box 2820 or 206 N Virginia St,
Reno, Newada
Ree Mgr: T Higginbotham
DEEP CREEK MINE, Stevens Co,
Zn, Pb
Mine Supt: Al Quine, Colville
300-TON FLOT MILL
(See Calif, Nev)

GRANDVIEW MINES
301-31 Radio Central Bidg,
Spokane 4
Pres & Gen Mgr; Karl W Jasper
VP: Paul Moetsel
Sec: E K Barnes
Geol: Eskil Anderson
HARTBAVER & DOSSER, MAKI,
LETZE. PROSPECTS, Northpoint
dist, diamond drilling
CURRENT CR CLAIMS PROSPECT,
Northpoint dist,
Under devel

HARRIS & BUMGARNER Northport Gen Mgr. Oliver W Harris, Jr ELECTRIC POINT MINE, 15 ml E of Northport, undergrd, PP Prod: 10 tons 10-TON GRAY MILL, Leadpoint Mill Foreman: Ernis Yocum

HOUGLAND, EVERETT & I G Republic VALLEY MINE, 10 mi N of Republic, undergd, Av. Ag Idie

HOWE SOUND CO,
CHELLAN DIV
Holden
Pres: H H Sharp
VP: E Richter
Sec: W T Holmes
Mgr: John Curson
Met: F H Brogan
Elec Engr: G J McCulloch
Cleol: T L Wilson
Safety Engr: C F Anderson
Purch Agi: E D Haddon
HOLDEN MINE, undergd, 12
mf from Lucajne, Cu, Au, Zn
Prod: 1, 500 tons
Mine Supi: W S Phillips
Mine Foremen: F A Robertson
2,000-TON GRAV FLOT MILL
Mill Supi: M E DeFoe
Assayer: J L Lairens

INDEX MINING CO
2430 Monte Vista Pi,
580415 93
Mgr: C V Brennan, Jr
SUNSET COPPER MINE,
Snohomiah Co, 67 mi NE of
Seattle, undergd, Au, Ag, Cu
Under devel

JIM CREEK MINES, INC Mgr: Frank H Mitchell, E 7119 Euclid Ave, Spokans JIM CREEK MINE, 6 mi NW of lone, undergd, Pb, Ag, Zn Under devel

JOHNSBURG MNG & MLG CO Rt 6, Box 261 Pres: C O Davis MINE, Skagit Co, Ag, Pb

KEEGAN MNG & DEVEL CO let & Mission Sts, Wenatchee Owners: Keegan Bros PROPERTIES, adj Gold King & MacBeath claims Under devel

KNOB HILL MINES, INC
208 Sansome St, San Francisco, Calif
Pres & Gen Mgr: HN Kuschler, Jr
VP: C L Cooper
Sec: D D Farley
Treas: L E Hellar
Gen Supt: AR Patterson
KNOB HILL MINE, Republic,
undergd, Au, Ag
Supt: J E Davis
Foreman: H-W Mareh
Engr: T L Pittman
400-TON PLOT MILL, Cyanidation
of tallings
Supt: Louis Lemback
Assay: A J Fergue

KROMONA MINES CORP 721 Lloyd Bldg, Seattle Pres & Gen Mgr: JF Krom VP: JF Brand Sec-Treas: George Wisser Elec Engr: D MacLeen Mech Engr: V J Dawson KROMONA MINE, 10 mi NE of Sultan, Snohomish Co, Ag, Au, Cu, WO3 Mine Foreman: Dan Kimball Mine Engr: R B Cole 100-TON FLOT MILL MIII Supt: W H Marquette

LAKE SERENE MNG CO, INC Box 66, Snoqualmie Pres: Frank Waugaman VP: C Johnson Sec-Treas: Mrs Haxel Waugaman WILBUR-INDEX MINE, 3 mt S of Index, undergd, Ag, Cu

LA SOTA, F P & JONES, E P Metaline Falls MINE, Pend Oreille Co, Zn, Pb

LITTLE KING TUNGSTEN MINE Deer Park Oper: W H West MINE, Loon Lake diet, Stevens Co, Cu

LOVITT MNG CO, INC

Box 1668, Wenatchee
Pres & Gen Mgr: E H Lovitt
VP; Vere McDowall
GOLDEN KING, 3 mi S of Wenatchee,
undergd & surface, Au, Ag, wilica
Prod: 250 tons
Mine Engr: Oscar Thompson

METALINE CONTACT
MINES, INC
(/o Therrett Towles
Old Natl Bank Bldg, Spokane
Pres: Stanty A Easton
VP: L J Randall
Sec: Therrett Towles
MINE, 1 1/2 and 8 of Metaline Falls,
undergd, Zn, Pb
Mine Supt: Clive Tedrow
Idle

METALINE MNG &
LEASING CO
310 Radio Central Bldg,
Spokane
Pres: Karl W Jasper
VP: E P Ryan
Sac: E K Barnes
Asst Bec: Mac C Hamilton
MINE, Metaline Falls, 100 mi N
of Spokane, Pb, Zn
Mine Supt: Clive Tedrow
Explor
(Leased to Sullivan Mng Co)

MINERAL CENTER MNG
CO, INC
1605 28th Ave, Seattle 22
Pres: DR Harting
VPe: CTFessey, ER Neighbor
Sec: FR Screven
Treas: BS Hewitt
MINERAL CENTER MINE, 15 mi NE
of Index, Silver Cr dist

MINES MANAGEMENT, INC
Northport
Pres & Gen Mgr: W R Green
VP & Treas: W T Anderson
Sec: L Howe
ADVANCE-MINE, 6 mi S of Northport,
undergd, Zn, Pb, Ag
Under devel
IROQUOS MINE, 3 mi NE of Leadpoint,
underge, Zn, Pb, Ag
Mine Supt: R 3 Williams
Geol: FE Oscarson
Under devel
70-TON FLOT MILL

MEW YORK-ALASKA
GOLD DREDGING CORP
1816 Smith Tower, Seattle
Pres: JR Crowdy
VP: G GC King
Res Mgr: Wm H Race
Asat Mgr: M F Bailey
Sec: Mark Mathewson
Elec Engr: Clarence Clark
Purch Agt: L E Robbins
(See Alaska & East)

MORTHWEST MAGNESITE CO Cheweish Pres: E A Garber VF: C A Sargent Sec: J C Stuers Geo Mgr: H A Ziebeli Plant Supt: Verdie Gentis Elec Engr: Young Spears Plant Engrs: Gene Kerns, Barney Endreine Parch Agt: L A Knight RED MARBLE MINE, 30 mi SE of Chewelsh, undergd, eurface, magnesite Mine Sover Roger L Pish Mine Foremen: Lloyd King, John Estes Mine Engr: J Brammer FINCH QUARRY, 3, 000-TON FLOT a HEAVY MEDIA

OVERSITE MINE
Wallace, Idaho
Owner: Richard May
MINE, 15 mi E of Republic,
undergd, Au, Ag
Ella

PACIFIC MUTUAL SILVER LEAD CO Box 1808, Spokane Pres: C A Lyon VP: M C Yeager Sec-Treas & Gen Migr: C A Gray ADDISON MINE, II md SE of Keller, Ag, Pb, Zn, W Engr: B O Goodell Under dayel

PACIFIC NORTHWEST
ALLOYS
Sox 6247, Hillyard Sta,
Spokane 28
Pres: Leo H Timmins
VPA Gen Mgr: H B Megill
Asst Gen Mgr: M E Heriel
Met. L Rumford
Meth & Elec Engr: W Swann
Sec; R E Lowe
Mng Engr: J Hayee
Purch Agt: C Stark
FREEMAN LAKE QUARTZ
QUARTY, 6 min of Newport,
surface, SiO2
Prod: 19,000 tons per mo

PACIFIC NORTHWEST MNG CO Bremserton Pres: Martin Morrison VP: Robt A Rukke Gen Mgr: Norman D Lindetey Geol: JW Melrose LUCILLE & RED TOP MINES, 2m N of Leadpoint, undergd, Zn, Pb, Ag, Cd Prod: 20-30 tone Under devel 75-TON PLOT MILL

PACNOR MINES, INC
310-313 Radio Central Bidg,
3pokane 4
Pres: Graham Lammers
VPI: Cline Tedrow
Sec: Kari W Jasper
RUSSIAN CREEK CLAIMS, 16 mi
N of Metaline Falis
Like

PEND OREILLE MINES

6 METALS CO

923 Old Nati Bank Bidg
Spokane i
Ch of Bd: S A Easton
Pres: L P Larsen
VP & Treas: Jens Jensen
Sec: A Wimberly
Gen Mgr: W. L Ziegler
Purch Agt: R G Walker
Gen Supt: L M Kinney
PEND OREILLE MINE, 2 mi N
of Metaline Falls, undergd, Zn, Pb
Supt: L G Billings
Foreman: Craig Cody
Mine Engy: A E Betchart
2400-TON FLOT MILL
Mill Supt: J C Cramoton
Assayer: R W Townsend

PIONEER MINING CO
Colville
, c/o D A Newland & Assoc
LONGSHOT MINE, Old Dominion
dist, Stevens Co, Ag, Zn, Pb, WO3

SAGINAW GOLD & COPPER MINES, INC 500 Gladstone St. Bellingham Pres & Gen Mgr: R L Averili See: Altah C Avarili MINE, 57 mi E of Bellingham, undergd, Cu, Au, & Under Sevul

SCANDIA MINING GROUP 32 E 39th Ave, Spokane Owners: Neeburg & Halleniue SCANDIA GROUP, 6 1/2 mi SE of Northport, Fb, Zn SPORANE MOLYBDENUM

T45 Peyton Bidg, Spokane Pres: Luke G Bayley MINES, Lincoln Co, Mo, Au, Ag

SPOKANE PORTLAND CEMENT 725 Old Net! Bank Bidg, Spokane Pres: CM Beil See: DD Hartman Purch Agi Chae E Cordell NAPOLEON MINE, Boyds, 130 mi N of Spokans, undergd, Pe Supt: Robert Crook

SPRINGDALE SILICA SAND,

SPRINGDALE SILICA SAMD, INC 401 Symone Bidg, Spokane 4 Pres: Frank Eichelberger VP & Gen Mgr: JW Melrose Sec: A A Stutter GUARRY-LYONS HILL MINE, Springdale, T mi SW of Springdale, surface, silica sand idle

SUNNY PEAK MNG CO SUMNY PEAK MFNG CO 100 Columbia Bidg, Spokane Pres: Charles J Weller VP: HE Maxier Sec: F W Kiesling Gen Supt: C L Butler MiNE, Concomulty, Okanogan Co, undergd, 4g Under davel

ALISMAN MNG & LEASING CO. LEASING CO T30 Peyton Bidg, Spokane Pres: H T Born YP: Waiter Hasen Seg: Sam Perry Trens: Clifford Taylor TALISMAN MINE, Leurier, undergd, surface, Ag, Cu, Fb, Zn, Cd 100-TON FLOT MILL

TUNGSTEN MNG & MLG CQ 711 Hutton Bidg, Spokane 4 Pres & Gan Magr: PH Casey VP: Joe Dillon Sec: Wellman Clark GERMANIA MINE, Welipinis, undergd & surface, WOg

UNITED COPPER MINES CO 10 S 3rd 8t, Yakima Proet A M Conway MINE noar Chewelah, Ag, Cu Mgr: Chan Delts Undar devest

WASH NON-METALLICS, INC WASH NON-METALLI Box 136, Chewelah Pres: R H Dills VP: Gordon Lavigne Sec-Treas: Phil Skik QUARRY, surface, marble

YOUNG AMERICAN MINES, INC 416 Virginia St, Seattle Pres: A Jandtner YOUNG AMERICA MINE, 25 mi IN of Coleville Under devel 30-TON FLOT MILL (Leased to Bonanza Lead Co)

ZENDA GOLD MNG CO 635 Securities Bldg, Seattle Pres: Robt T Whiting VP: B M Snyder (See Alauku)

WISCONSIN

AMBR ZING LEAD & SMLTG CO LITTLE GRANT MINE, 5 mi EW Flatteville, undergd, Zn, Pb GRAV MILL

Idle (See Amer Zinc-Ill, Okla, Mo, South, Tenn, Wash & Tex)

BAKER, G M, MLG CO TAILINGS, various mines, Pb, Za HOSKINS MILL, Shulleburg 350-TON FLOT Idle BIRKETT, ARTHUR Basel Green LITTLE GENTE MINE, Po, Za

CALUMET & HECLA, INC WISCONSIN BRANCH, 4 mt S of Baulsburg
Branch Mgr: John Lesio
KITTO, HAYDEN, GENZLER
MINES, undergd, Za, Pb
Mine Poreman: G F McKereghan
1, 200-TON FLOT MILL
MILL Supt; Geo Sullivan (See Mich)

CUBA MINING CO CUBA MINING CO
Platteville
Treas: A. W Heins
Mgr: E. G. Deutman
ANDREWS MINE, 4 mi SW of
Shullsburg, Za, Ph
Supt: Prancis Cherry
LYNE Mill., grav
Prod: 13,000 tone assessily

DAVIS MNG ENTERPRISE Linven
Gen Supt: Vernon C Davis
Purch Agt: J C Carliele Asso
DAVIS MINE, undergd, Zn, Po GRAV FLOT MILL Mill Supt: McFee Under construction

DODGEVILLE MINING CO 924 Gay Bldg, Madison
Part: JJ MacDonald
Gen Mgr & Part: C W Singer
DODGEVILLE #3 MINE, Dodgeville, Pb. Zn Prod: 250 tome Gen Supt: E J Fredrichs Foreman: J W Wagner 150-TON GRAV FLOT MILL Foremen: Walter Cook
Flot Mill Foremen: Alvis Johnson

EAGLE PICNER CO MNG & SMLTG DIV Nasel Green Mgr: C O Dale BIRKETT MINE, undergd, Zn, Pb (See Ill, Okla, Aris, Nev & Central)

GATES, JOHN Platteville OATES MINE, undergd, Zn, Pb

GIRMAN MINING CO Mineral Point Oper: John Girman MINE, undergd, Zn, Po

HERRON & GLENDENNING Shullsburg MULLEN MINE, undergd, Zn, Pb

HOMESTEAD MINING CO Platteville Pres: R W Piquette VP: E Rasque Sec: W J Thompson ACME & RASQUE MINES, near Platteville, undergd, Zn. Ph' 100-TON GRAV FLOT MILL.

MAYER & THIEDE Shulleburg ROWE LEAD MINE, undergd, Zn, Pb

MEEKER'S GROVE MNG CO 305 Broadway St. Platteville LIBERTY & LEO V MINES, 5 mi NE of Cuba City, undergd, Zn 60-TON GRAV PLOT MILL, 1 mi from Liberty Mine

MICKEY MINING CO Partner: C J Fox DOYLE HEIRS LEASE, undergd,

MIFFLIN MNG CO Livingston Pres & Gen Mgr: Richard Metcalf COKER BICKPORD MINES, Mifflin undergd, Zn, Ph 125-TON FLOT MILL

MINERAL POINT MNG CO Mgr: Curtie Simpson RICHARDS LEASE, 1/2 mi N of Mineral Point, Zs, Pb

MONTREAL MINING CO Memotresi
Gen Mgr: Frank J Smith
MONTREAL MINE, 4 mi W of
Burley, undergd, Fe
Prod: 4,000 tone per day
Mine Supt: C A Bjock
Acel Bupt: C F Guenther
(See Minn & Central)

MURRAY & RICHARDS 500 Minerva St, Darlington Mgr: J H Richards JAMES MINE, Shulleburg, undergd, Zin, Ph Idia

MEW DALL MNG CO Cube City Oper: Delbert Dall MINE, undergd, Zn, Pb

THE NEW JERSEY ZINC CO THE MEW JERSEY ZINC CO Platteville ENFLORATION STAFF Res Geol: J M Hague Ch Engr: L E Antonides Geol: G Willerd Geol: R JSmith (See East, Colo, New Mex & South)

PICKANDS MATHER & CO ODANAH IRON CO CARY MINE, Hurley, undergd Supt: JC Wangaard (See Minn & Mich)

PIQUETTE MNG & MLG CO
(Joint Venture: F.B. Piquette &
American Zinc Lead & Smitg Co)
BOX 4, Plateville
Gen Mgr: F B Piquette
MiNE IS mi w of Plateville,
undergd, Zm, Pb
Under devel
(See Axer Zinc-Ill, Okia, Mo, South,
Tenn, Wash & Texas)

VAIL ENGINEERING CO Box 59, Platteville Pres: A V Austerman Sec-Treas: Marjorie Webb CHAMPION MINE, New Diggins undergd, Zn, 16 300-TON GRAV FLOT MILL Mill Supt: Charles Bo Assayer: M Webb

VINEGAR WILL ZINC CO Platewille
Gen Mgp: W N Smith
Gen Nupt: John Lacke
Works Acct: A W Heins
EAST BLACKSTONE, MULCAHY,
HANCOCK MINES, Shulloburg,
HANCOCK MILL, FLOT
Prod. 800 long see month

ZONTELLI BROS, INC DAVIDSON MINE, Florance, surface, Fe Mine Supt: Don Olin

WYOMING

AMERICAN COLLOID CO Upton

Gen Supt: Edwin Buefield

Elec Engr: A G Clem

Purch Agt: Roy H Harris

MINE, near Upton, surface, Mine Supt: Orville Horn 100-TUN MILL. Asst Mill Supt: Donald H See S Dak, Central & Sou

AMERICAN URANIUM CO PROPERTIES, Converse & Campbell Counties, U

BLACK HILLS BENTONITE CO. Pres: H T Thorson Gen Mgr: A C Harding

MINE, Moorcroft & Upton, surface Supt: Raiph McCoy 180-TON MILL, drying & grinding Supt: Boyd Ash

COLORADO FUEL & IRON CORP Sunrise
Gen Mgr, Mines: G H Rupp
Aset Mgr, Mines: Robt R Williams Jr
Chief Geol: D A Carter
Chief Elec; Ming Dept: W JSchenier
Chief Elec: R E Davis
Purch Agt: L C Rose
SUNRISE MINE, 7 ml N of Guernsey,
undered. Pr SUNRISE MINE, 7 mi N of Gue undergd, Fe Prod: 2,000 tons Mine Supt: M L Sisson Mine Foreman: A E Testolin Mine Engr: H B Lynch (See Colo, 3 Dak)

COPPER KING MNG CO Cheyenne
Pres & Gen Mgr: Harry Fergueo
COPPER KING MINE, 22 mi W of
Cheyense, Au, Ag, Cu
Under devel

EDGEMONT MINING CO. Edgement, S Dakota PROPERTIES, Frement Co,

THE GREAT WESTERM
SUGAR CO
Box \$306, Terminal Annex,
Denver 17, Colorado
Pres: Frank A Kemp
VP & Gen Mgr. Herman Hartburg
Sec: H R Coreberg
Mech Engr: Chas E Hirsch
Elac Engr: Wayne Angerbrite
Purch Agt. Carl R Roberts
HORSE CREEK QUARRY, 32 mi NW
of Cheyenne, undergd, limestone, THE GREAT WESTERN HORSE CREEK QUARNY, SE has been concerned to the control of the co

BOMESTAKE MINING CO 100 Bush St, San Francisco 4 California PROPERTIES, U, Under devel (See S Dak & Utah)

SUBSID OF FOOD MACH &
SUBSID OF FOOD MACH &
CHEM CORP
Box 872, Green River
Gen Mugr: C A Romano
Assi Admist: O R Bowland
Gen Supi; N E McDougal
Research: W C Bauer
Elec Engr: L Ruffini
Plant Engr: H F Young
Safety Engr: J Kovach
Purch Agt: L Swassy
MINE, 20 mi # of Green River,
undergd, trona undergd, trona Prod: 2,500 tons WESTVCO MINE, 20 mi W of westver mine, 20 m w Green River, trons Prod: 2,000 tons Mine Supt: G B Gaylord Asst Mine Supt: R F Love Mine Foreman: C E Johns Mine Eagr: L K Marshall 2,000 TON PL, solution & Pi Supt: JR Jacobucci
Acet Mill Supt: A P McCue
Acesy: N E Brunevold
Chem: Dr W C Bauer
(See Calif & Central)

INTERNATL MINERALS & CHEM CORP, EASTERN CLAY PRODUCTS DIV PRODUCTS DIV
Belle Fourche, S Dakota
MINE, Crock Co, surface, bente
Mgr & Purch Agt: K L Arthur
Supt: J A Brown
Mills, Belle Fourche, S Dakota
(See Aris, Coln, Mont, New Mex,
S Dak, Central & South)

INTERSTATE CHEM CO 2303 Northern Life Tower, 2303 N Seattle, Wash MINE & MILL, Cody, gypeum

KERR-McGEE OIL INDUS, INC NAVAJO URANIUM DIV

MAGNET COVE BARIUM CORP Box 832, Greybull Mgr: Lee Grenier MINE, 8 mi E of Greybull, surface, 250-TON MILL, drying & grinding Mill Supt: John M Copenhaver

MID-CONTINENT EXPLOR CO Piners: A J Jatches & H M Brickel Mines: 15 mf E of Atlantic City 7 mi N of Sundance rare earth, Mn, CaFg, WO3 (See S Dak)

NATE LEAD CO, BAROID SALES DIV Belle Fourche, S Dakota CLAY SPUR, OSAGE & COLONY PL, Colony, surface, bento DRY GRINDING PL Supt: D K Rowand (See Calif, S Dak, Nev, Tex, Central & East)

PHOSPHATE FERTILIZER, INC Free: Mayben Fox VP: Joe Profaises Sec-Treas: Arthur Pis Gen Mgr: Matt Bertagnolli PHOSPHATE MINES, INC, 9 mi N of Susie, undergd, phosphate 200-TON MILL, Susie Foreman: Rex Borino

SAN FRANCISCO CHEM CO Dr F Montpelier, Idaho LEEFE MINE, 3 mi NW of Sage, Mine Supt: PS Pugmire PAWNEE MINE, 8 mi 8W of Sage, PAWNEE MINE, o mi sw of Sa undergd, phosphate Prod: 500 tons Mine Supt: Jack Hawn CRUSHING, PULVERIZING & BAGGING PLANT, 2 mi NW of Sage (See Idaha & Utan)

SCHROEDER MINING CO McGregor, Iowa MINE, near Sunrice, Fe 1800-TON HMS PLANT, Guernsey (See South)

SCHUNDLER, F E CO, INC Rock River Pres: F E Schundler VP: J C Kingsbury Sec: L H Sprague MINE, 17 1/2 mi NW of Rock River, Prod: 200 kms
Mine Supt: Ralph Madison
Asst Mine Supt: Harland Pierce 240-TON MILL Mill Supt: L D Robinson Asst Mill Supt: Bill Wilkinson

WHITE HORSE MNG CO Atlantic City
Mgr: ER Lund
DIANA MINE, undergd, Au

WYODAK CHEM DIV, PED FOUNDRY SUPPLY CO 4600 E Tiet St. Cleveland, Onio Pres: Raiph Ditty VP & Gen Mgr: L.B Heyl Sec: Elmer Ditty 700 tons Mine Supt: John T McKean DRYING & PULVERIZING MILL, Upton Supt: Carl Barritt

CENTRAL

ARK, IND, IOWA, KANS, OHIO, NEBR, NO DAK

AMERICAN CYANAMID CO Box 726, Little Rock, Ark MINE, 4 mi S of Little Rock surface, bauxite ore Mine Mgr: R H Harris (See Sauth & East)

AMER SMLTG & REF CO OMAHA SMLTR & REFINERY Omaha, Nebr, Pb Mgr: Ray C Skow Gen Supt: J C Reinhardt (See Ill, Okla, Aris, Colo, Calif, Ida, Mont, N Mex, Utah, Wash & East)

ARKANSAS GYPSUM CO Murfreesboro, Ark
Pres & Gen Mgr: Vernon B Lewis
GYPSUM MINE, Pike Co, Kans
GYPSUM MINE, Murfreesboro, undergd, surface Prod: 3,000 tons per me

ARKANSAS LIMESTONE CO Cushman, Ark MINE, Independence Co, Ark, Mn

BASIC REFRACTORIES, INC 845 Hanns Bidg, Cleveland 15, Ohio Pree: H P Eelle, Jr Mgr Opr: Max Muller h Ast: G H Rutherford MAPLE GROVE QUARRY & PL Maple Grove, Seneca Co. Ohio, surface, dolomite Supt: H C Bonnell Prod: 1,800,000 tons per year

BOB WHITE MINING CO CHUBB, CHEROKEE MINES, Blue Mound Dist, Kans, Zn, Pb Supt: Jack Osborne

BUTLER BROS

1300 Leader Bldg,
Cleveland 14, Ohio
Ch of Bd: Patrick Butler
Pres: J H Thompson
Pres: G W Humphrey,
H L Pierce Sec: L W Spang Treas & Asst Sec: C W Gardner (See Minn)

C & M MINING CO
Box 209, Baxter Springs, Kans
Supt: H G Milligan
MINE, Baxter Springs area, undergd, Zn, Pb 200-TON GRAV-FLOT MILL

CELOTEX CORP Port Clinton, Ohio AMERICAN #1 MINE, gypsum MINE & PLANT, Fort Dodge, lows

CERTAIN-TEED PROD CORP MINE & PLANT, Ft Dodge, Iowa Gypsum (See Mich, Tex, Utah & East)

THE CLEVELAND-CLIFPS-IRON CO 1460 Union Commerce Bidg, Cisveland 14, Ohio Chairman: A C Brown Free: W A Sterling VP Mng: C W Allen Aest VP Mng: Fayette Brown, Jr Gen Mgr: G C Holt Mgr Mich Minee: JB Westwater Mgr Min Minee: HJ Leech (See Minn & Mich)

CONNELY & GONCE North Willow, Baxter Springs,

COMSOL CHEM IND, INC 840 Mellie Esperson Bidg, Houston 2, Texas Pres: George L Bond VP & Gen Mgr: ES Rothrock Sec: R L Berryman Aast Gen Mgr: C M Hickey

Gen Supt: JC Crowder
Met & Geol: S M Stelling
Purch Agt: W G Roberts
MINE: PEISER SPRU, Box 65,
Arch St, Sub-Station, Little Rock,
Ark, mine, 6 ml s of Little Rock,
bauxite, clay, surface,
Supt: E J Creider
Aset Supt: Kenneth Guertin
Under devel
100-TON MILL, drying,
grinding & magnetic separation

CONSUMERS ORE CO 1300 Leader Bldg, Cleveland 14, Chico
Pres: G W Humphrey
VP: P G Harrison
Sec: L W Spang
Trass & Asst Sec: C W Gardner
Ess Minsh

CONTACK MINING CO. INC CONTACK MINE, Baxter Springs, Kansas, undergd, Pb, Zn Prod: 250 tons (See Okia)

CROUCH MNG CO, SUBSID OF GEN ABRABIVE CO, INC Box 117, Bauxite, Ark Pl & Mine Mgr: L M Richard YOUNG MINE, undergd, bauxite Mine & Mill Supt: Charles Von Ness 200-TON CALCINING KILN

DINES MINING CO Baxter Springs, Kane BLUE MOUND GRAV PLOT MILL, Zn, Pb Prod: 30,000 tons per year Supt; H G Weidman

DOUGLAS MINING CO DOUGLAS MINING CO
1300 Leader Bidg, Cleveland 14,
Ohits
Chairman: JH Thompson
Pres: G W Humphrey
VPs: Perry G Harrison,
H L Pierce
Sec: L W Spang Treas & Asst Sec: C W Asst Treas: S L Engel : C W Gardner

DURANGO MINING CO Durango, Iowa Mgr: J E Miller MINE, undergd, Pb Under devel

EAGLE PICHER CO, MINING & SMLTG DIV BIG JOHN, LEOPARD, WEBBER, WESTSIDE #2, FOLEY #3, WILBUR, MUNCIE MINES, Kansas, Pb, Zn LEAD SMELTER, Galena, Kans Mgr: Fred Clearman (See Okia, Ill, Wisc, Ariz & Nev)

FEDERAL MNG & SMLTG CO WHOLLY-OWNED SUBSID OF AMER SMELTING & REF CO CENTRAL DIV, Baster Springs, Kans Gen Supt: W C Ball Gen Supt: W C Ball (See Okla, Mo & Idaho)

GLIDDEN COMPANY, CHEMICAL, PIGMENTS & METALS DIVISION Union Commerce Bidg, Cleveland, Ohio Gen Sales Mgr: R B Queloe (See Calif & South)

GRACE JARRETT MNG CO PEDERAL-JARRETT MINE, Kane (See Okla)

HANNA, THE M A, CO
1300 Leader Bidg,
Cleveland 14, Onio
Agent for the following companies:
Butler Bros, Consumers Ore Co,
Douglas Mining Co, Hanna Cosi &
Ore Corp, Hanna Iron Ore Co,
Hanna, Ore Mining Co, Mahland
Ore Co, Morton Ore Co, Osark
Ore Co, Fliblin Mining Co,
Richmond Iron Co, South Agnew
Mining Co, Mining Co (See M A Hanna, Oregon)

HANNA COAL & ORE CORP 1300 Leader Bidg Cleveland 14, Onto Chairman: JH Thompson Pres: G W Humphrey VPo: R C Fish, Perry G Harrison, A B Kern, H L Pierce

Sec: L W Spang Treas: W C Pieper Aest Treas: S L Engel Asst Secs: C W Gardner, L E McCheensy, W C Pieper (See Minn & Mich)

HANNA IRON ORE CO ANNA IRON ORE C 1300 Leader Bidg, Cleveland 14, Ohio Chairman: JH Thompson Pres: G W Humphrey VPs: Perry G Harrison, H L Pierce H L Pierce VP & Sec: Paul E Shroads Asst Secs: M E Arden, L W Spang Aest Sec & Treas: C W Gardner Asst Treas's: S L Engel, C G

MANNA ORE MINING CO MANNA ORE MINING CO
1300 Leader Bidg,
Cleveland 14, Ohio
Chairman: JH Thompson
Pres: G W Humphrey
VPs: Perry G Harrison,
H L Pierce
See: L W Spang
Assi See & Trees: C W Gurdner
Asst Trees: S L Engel
(See Mico)

HARRIS MINING CO, INC. HARRIS MINING CO, INC
440 E18th, Batter Springs, Kans
Pres & Gen Mgr: Loren Keenan
VP & Supt: A T Harris
Sec-Treas: Robt Nichols
GOLDEN ROD & No 24 MINES, 5 mi
w of Batter Springs, undergd, Zn. Pb
Prod: 700 tons Foreman: (See Okla) an: Frank Poole

HELEN H MINING CO
Box 326, Baxter Springs, Kans
Mgr: Claude Jones
MiniES, Baxter Springs, Kans &
Picher-Cardin, Okla areas, undergd, Zn, Pb 700 TON GRAV-FLOT MILL

IN LAND STEEL CO FLUORSPAR OPER, Marion, Kentucky Supt: W G Robinson (See Mich, Minn & III)

INTERNAT'L MINERALS & CHEM CORP MINES, Bondclay & Lawcom Onio, Mgr: G D Anderson Supt: Bondclay: C Queen Supt: Lawco: L Brisker Mill., Bondclay, grinding & Mill., Bondelsy, granding a pulverising Mill., Lawco, grinding a pulverising (See II), Aris, Colo, Mont, New Mex, S Dak, Wyo, South & East)

LIZA JANE MNG CO
Box 343, Baster Springs, Kane
Prea & Gen Mgr: R W Love
Sec: Warren E Estes
Mech Engr: Fred E White
LIZA JANE MINE, I ml W of
Baster Springs, weekerd, 20 Fb. Baxter Springs, undergd, Zn, Pb

MAHLAND OBE CO MAHLAND ORE CO
1300 Leader Bldg,
Cleveland 14, Ohio
Press: JR Thompson
VFs: PD Block, Jr, G W Humphrey,
H. L. Pierce
Soc: L W Spang
Tress & Asst Sec: C W Gardner
(See Mich)

MARK TWAIN MNG CO Box 241, Picher, Okla Mgr: W L Childrees JAHRETT MINE, Kane, Zn, Pb

MELROSE MINING CO Rt 2, Bester Springs, Kans Opers: John W Powers & Assoc MINES, Picher, Okla, Zn. Pb

MID-CONTINENT LEAD & ZINC CO 1101-1/2 Military, Baxter Springs, Pres: Kenneth Childress MINES, WRIGHT LAND GROUP

MONTREAL MINING CO Hanns Bldg (Box 5508) Cleveland I, Gho Fres: G G Wade VF: Courtney Burton Sec. R H Worton & Co & Montreal Bing Co, Minn & Wisc)

NATL GYPSUM CO
MINE & PLANT, Medicine
Lodge, Knae, undergi, gypsum
Pl Mgr: D C Chade
Mine Sugit S J Shepler
QUARRY & PLANT, Ft Dodge,
lowe, gypsum
Pl Mgr: N J Marsham
Quarry Sppt: J B Pitts, Jr
QUARRY & FLANT, Lockey,
Ohto, Linnestone
Pl Mgr: F C Mallery
Quarry Supt: C W Sexton
QUARRY & PL, Cibsonburg,
Chito, Linne
Pl Mgr: J C Downey
Quarry Supt: J F Fehlinaber
(Sue Tax, Mich, South & East)

NATL LEAD CO, BAROID
SALES DIVISION
MAGNET COVE OPER, Malvern,
Ark
MINE, 12 mi W of Malvern, eurface,
Fix
Fix
Supt: EC Farrel
Assi Supt: W A Halbert
Foreman: Jim Chaney
Engr: W F Timbrook
1500-TON FLOT MILL
Supt: EC Farrel
Assay: William Brooks
TRI-STATE OPER, Box 30,
Bexter Springs, Kans, Zn, Fb
2, 100-TON MILL
Gen Supt: K A Noba
(See Mo. Calif, Nev. S Dak & Ten)

OZARK ORE CO,
SUBSID OF HANNA COAL & ORE CO
1300 Leader Bidg,
Cieveland 14, Chie
Pres: G W Humphrey
VPs: P G Harrison, H L Pierce,
R C Fish
Sec: L W Bpang
Trace & Asst Sec: C W Gardner
Dist Sept: W F Shinners
(See Hanna Coal & Ore Co, Central & Mo)

PHILBIN MINING CO 1300 Leader Bidg, Cleveiand 14, Ohio Pres: G W Humphrey VPs: P D Block, Jr, H L Pierce Sec: L W Spang Treac & Aset Sec: C W Gardner (See-Blum)

PORCCEL CORP MILL, Pulaski Co, Ark, Bausite (See East)

REPUBLIC STEEL CORP
25 Prospect Ave NW, Cleveland
Chic
Press: C. M. White
VP: W. M. Kelley
Asst VP: E. B. Winning
Purch Agt: F. J. Laskey
(See Minn, Mich & East)

RESERVE MINING CO
(Owned by Republic & Armoo
Steel Corpl.)
Guidhall Bldg. Cleveland 15, Ohio
Press: C M White
VP: C L Kingsbury
VP, Chg Oper: W M Kelley
Sec: G C Nations
Treas & Comp: J Wm Bryant
Mgr. Oper: R J Linney
Asst Mgr. Oper: John Dunlop
Exes Super, Engr: P M Darner
Consul Engr: 11 W ymae
Prep Engr: Oscar Lee
Dir, Pub Rel: Edward Schmid, Jr
Dir, Indus Rel: D S Wilkin
(See Mixed)

REYNOLDS MINING CORP Boyle Bidg, Little Rock, Ark MINES, Saline & Pulaski Cos, Ark, undergd & surf, bauxite, fluorepar (See Coin)

BICHMOND IRON CO
1300 Leader Bidg,
Cleviand is, Ohio
Proc: G W Humphrey
VPs: C W Back, B L Pierce
P G Harrison
Sec: L W Spang
Trees & Acat Sec: C W Gardner

ROAMOKE MINING CO HOMESTAKE & HARTLEY MINES, I mak W of Bester Springs, Kane, undergé, Zn. Pb Mine Poreman: Raymond Harper Dille (See Okla)

S S & C MINING CO MINE, Blue Mound, Kase, Za, Pb Opers: Ben Clark & Assoc Idle (See Onla)

ST JAMES MINING CO Hanna Bidg, Cleveland I, Ohio Press: A F Peterson VFs: C L Kingsbury, N S Taylor Sec; G C Nichols Treas: E W Sloan, Jr (Sec Oglebay Norton & St James, Minn)

SEMPLE, C Y
Baster Springe, Kane
3,000-TON GRAV PLOT MILL,
Idle
BALLARD MINE, surface
Idle
MINE, Cherokee Co, Kane
Supt: E N Smith
Mech Engr: Roy Pigg

SIERRA TALC & CLAY CO Box 200, S Pasadena, Calif. MILL, Grand Island, Neb (See Calif, Nev)

SOUTH AGNEW MNG CO 1300 Leader Bidg, Cleveland 14, Ohio Pres: A F Peterson VPs: G W Humphrey, H L Pierce Sec: L W Spang Treas & Asst Sec: C W Gardner Gisw Minn)

TIGER MINING CO POX MINE, 1 md w of Treece, Kans, undergd, Zn. Pb Mine Foreman: Raymond Kennedy Idle (Sec Okla)

TRI-STATE OPERATION
Box 30, Baxter Springs, Kane
Gen Supt: K A Nobe
BALLARD, HARTLEY, SHANKS,
KEITH, SWALLEY, SMITH & CLARK
MINES, Za, Po
2, 100 TON GRAY-FLOT MILL

U S GYPSUM CO
Works Mgr: M E Davidson
MINE, Ft Dodge, Iowa, surface,
gyssum
(See III, Mich, Calif, Colo, Mont,
Nev, Tex, Utah, Wash, South & East)

U S STEEL CORP AMERICAN STEEL & WIRE DIV Rockefeller Bidg, Cleveland 13, Ohio Pres: W F Munford VP: V H Leichliter Gen Mgr: John Craham Asst Gen Mgr: M W Millard (See Mont, Utah, Minn, South & East)

UTLEY, A T Box 391, Cape Girardeau, Ark MINE, Batesville, Ark, 8 mi (rom Phiffer, Ark, surface, Mn Idia

W M & W MINING CO, INC Box 326, Baster Springs, Kans Pres & Gen Mgr: E G Mattieon VP: Ralph Chambers Sec & Geol; Ferrel E Williams Elec Engr: J D Helmick 250-TON FLOT MILL, 2 mi NW of Baxter Springs Mill Supt; Marry Lanham (Res Okla)

WASEM GYPSUM PROD CO PLANT, Pt Dodge, Iowa, Gypsum

WESAH MINING CO Box 246, Treece, Kans Mgr & Owner: Tom Kiser (See Okia)

WEST MORELAND
MANGANESE CORP
Box 43, Batesville, Ark
Pres & Gen Mgr: O E Sellere
VP: Herman Müler
Soe: W H Specht
MINE, 6 ml N of Cushman, Ark,
surface, Min

SOUTH ALA, PLA, GA, KY, LA, MISS, N C, S C, TENN, VA

ALABAMA PLAKE
GRAPHITE CO
320 Comer Bidg,
Birmingham, Ala
Pres: W. L. Ebumate, Jr
VP: M. E. Haworth
VPA Gen Mgr: W. L. Mcore
Sec: JF Berry Baugh
Met: L. B. Adams
POCAHONTAS MINE, 4 1/2 mi W
of AshBand, Ala, Flake graphite, mica
Prod: 200 tions
200-TON FLOT-GRAV MILL,
Bockhosmas
Mill Supt: L. W. Moore
Mill Foreman: L. S. Moore
Assey: L. B. Adams

ALLIED CHEM & DYE
CORP, GEN CHEM DIV
BOX 389, Galax, Va
GOSSAN MINES, 8 mi N of
Galax, undergd, pyrrhotite
Supt: Jamee O Nichols
Mine Foreman: R F Dillon
PLOT-GRAV MILL
Mill Foreman: OW Manuel
(See Colo, Mo, New Mex, & East)

AMERICAN AGRI CHEM CO Pierce, Fla PEBBLE MINE, phosphate book BOYETTE MINE, 80 PIERCE TRACT 612 MINE Sew East)

AMERICAN COLLOID CO
Aberdeen, Miess
Gen Mgr: Faul Bechiner
PANTHER CREEK MINES,
near Aberdeen, Mies, placer,
lumming prod; 155 tons
Mine Supt: Claud Acord
Asst Mine Supt: Edward Birkholta
150-TON KILL
WHITE SPRINGS PLANT, White
Springe, Miss, bentonite
Prod; 130 tons
Mine Supt: Claud Acord
Asst Supt: Edward Birkholty
(See Ill, S Dak, Wyo)

AMERICAN CYANAMID CO SADDLE CR MINE, Brewster, Fla surface, phosphate rock 3,030-TON FLOT MILL, washer SYDNEY MINE, Brewster, Fla, surface, phosphate rock 2,000-TON FLOT PL, washer Mgr: Arthur Crago PIGMENTS DIV, Finey River, Va Hamenite PI Mgr: JS Carter (See Central & East)

AMER ZINC CO OF TENN,
SUBSID OF AMERZINC, LEAD &
SMELTING CO
Mascoi, Tenn
Pree: B I Young
Gen Supi: H A Coy
Assi Gen Supi: Win Black
Purch Agi: C C Siek
MASCOI 72 MINE, Mascot, Zn
GRASSELLI MINE, New Market,
Tenn, Zn
JARNAGIN & ATHLETIC MINES,
Jefferson City, Tenn, Zn
Supi: M J Langley
Engr: W H Johnson
Mech & Elec Engr: I C Mitchell
Safety Engr: Harold Thompson
Ch Geol: C R L Oder
BURTH FRIENTH STATRIN
MINE, 812 MILE
Supi: D D Grove
Aset Supi: R B Brackin
MRt. Jim Polhamus
Assay: D E Chadwick
Proct. 4, 000 tons
(See Amer Zinc-Ill), Central, Tex,
AmerZinc, Leed & Smitg-Mo, Okla,
Wash)

APPALACHIAN MNG & SMELTING CORP Embreville, Tenn Pres: G R Warren MINE, Fb, Za ARMOUR PERTILIZER
WORKS
Columbia, Tenn
Supt: W B King
PRIOS PHATE MINE
TRIPLE SUPER PHOSPHATE
PL, Bartow, Pla

ARRINGTON MINING CO Cedartown, Ge Pres: C B Arrington IRON MINE

BARTOW MINING CO Cartereville, Ga Owner: Geo Shropehire IRON MINE

CAROLINA MINERALS
CO. INC
Box 415, Bedford, Va
HARRIS 42, WATSON, JOHNSON &
SCOT & COX MINES, Bedford &
Piney River, Va, feldspar, miga &
quartz
FLOT MILLS, Kona & Spruce Pine
N C, feldspar

COHUTTA TALC CO, THE
Drawer 283, Dalton, Ga
Pres: L F Stare
VP: L B Farrar
Gen Mgg: Trammell Stare
Sec: % A Farrar
FORT MINE, 7 ml E of Chatsworth,
Ga, undergd, talc & soapstone
MILL, Chatsworth, Ga

COLLOIDAL PHOSPHATE SALES Box 1566, Tampa I, Fia Pres: Chris Fagg VP: E P Fagg Sec-Treas & Gen Mgr: G T Dyer MINE, I mi E of Dunnellon, Fia, surface, colloidal phosphate HAMMER MILL

CÓLITZ MNG CO
Pottaville, Pa
MANGANESE DEPOSIT, Damascus,
Va, churn drilling, open pit stripping,
Mn, clay
1, 200-TON HMS PLANT, under constr

COLUMBIA ROCK PROD CORP Columbia, Tenn PNOS PHATE MINES

COMMERCIALORES, INC
Box 156, Clover, S Carolina
Pres & Gen Mgr: A R Eckel
VP: H S Doty
VP & Gen Supt: S J Beers
Sec: R E Mets
Purch Agt: B L Wright
HENRY KNOB MINE, 4 mi W of
Clover, surface, kyanite
Prod: 500 tons
Mine Poreman: Len Hardin
500-TON FLOT MILL.
Mill Foremen: Richard Lochmund,
B S Bonebrake

CONSOL HIGH GRADE ORE CO
Box 532, Cleveland, Tenn
Partners: G S, 1B & J D Murray
HAMBRIGHT MINE, Daiton Pike,
Tenn, hydraulic placer, Mn. Pe,
Lille
HAMBRIGHT MILL, 50-ton grav
Lille
HEISKELL MINE, Sweetwater, Tenn,
surface, Mn. Pe
Prod: 30 tons
Mine Supt: W C Mendenhall
70-TON GRAV MILL

CRIDER, J WILLIS,
FLUORSPAR CO
Mexico, Ky
Gen Mgr: B M Travis
McNEELY & MARBLE MINES,
6 mi NE of Fredonia, Ky,
undergd, CeP
Prod: 25 tons
100-TON GRAV-FLOT MILL

DAVISON CHEM CORP
PRIOSPRATE DIV
BOX 471, Bartow, Fla
Div Mgr: A T Cole
Asst Div Mgr: J M Harris
Purch Agt: E J Charette
Mgr, Prod Plag: J L Hunter
Prod Supt: W R Fort
Gen Mines Supt: B P Jones
Maint Supt: E J Purcell
Ch Engr: F J Losson
Ch Chem: C D McDowall
Safety Engr: J R Terry
PAUWAY 24 MINE, Bartow, surf,
phosphate
Surt: W A Allen

BONNY LAKE MINE, Bartow, 9 nurface, phosphate Supt: P H Elliot RIDGEWOOD DRY MILL Supt: C B Blood (See East)

ELECTRO MANGANESE CORP 1400 Loraine, NW Knozville,

1400 Loraine, NW Knoxville,
Temn
Pres: E M Wanamaker
VPs: R H Cromwell, T W Bennett
Treas: Otto Neumann
Sec: W F Ferris
Supt: W A Parson
Gen Mgr: W D Morgan
Pit Mgrs: H L Chamberlain &
W A Parsons
Research Engr: W L Hammerquis
Ch Engr: D D Forbes

W A Parsone
Research Engr: W L Hammerquist
Ch Engr: D D Forbes
Sales Rep: D S Colline
Purch Agt: F G Raggett, Jr
REFNERY (TWO PL), Knowville,
electro manganese
Prod: 7,200,000 lbs per year at
each plant

PEDERAL CHEM CO Mt Pleasant, Tenn Mgr: DS Miller PHOSPHATE MINE

FELDSPAR FLOTATION CO Spruce Pine, N C FLOT MILL, feldspar

FELDSPAR MILLING CO Bowditch, N C MILL, Yancey Co, dry grinding, feldspar

PLORIDA ORE
PROCESSING CO
Box 417, Melbourne, Fla
Pres & Gen Mgr: Frederick A Hauch
VP: Robt L Holland
Assts to Pres: Albert E Grogan,
G D Slaughter
Sec: Vincent H Beckman
Gen Supt: Herman Koeppel
MINE, Brevard Co, surface, rutile,
timenite, zircon, garnet, monasite
Prod: 30 tons
60-TON GRAV MILL

FLORIDIN CO Warren, Penn MinES, Quincy & Jamieson, Fla, surface, fuller's earth MILLS

FOOTE MINERAL CO
18 W Chelten Ave, Philadelphia
44, Pennsylvania
Press: G H Chambers
VP: F B Shay
Sec: E G Enck
Gen Mgr: J F Castle
Geol: T Kesler
Purch Agt: S Morrison
KINGS MOUNTAIN MINE, Kings Mtn,
N C, 3 mi SE of Kings Mtn, surface,
Li, Sn, columbite, beryl, mica, feldspar
Mine Supi: E R Goter
Asst Supi: J Dempsey

FREEPORT SULPHUR CO
161 E 42nd St, New York 17, N Y
LOUISIANA DIV, mines at Grande
Ecaille, Garden Island Bay, Bay
Ste Elaine, S
VP & Div Mgr: K T Price
(See Texas, East)

GAMMAGE MINING CON Cedartown, Ga IRON MINE

GENERAL GRAPHITE CO
320 Comer Bidg, Birmingham, Ala
Pres: W. Shumate, Jr
VP's: M. E. Haworth, E. J. Watkins &
W. L. Moore
Sec: J. F. Berry Baugh
MINE, Ashland, Ala

GEORGIA TALC CO
Chatsworth, Ga
Pres: M W Glenn
VP: W W Rolf
Gen Mgr: F T Glenn
Purch Agt: Fred Long
SHOP TUNNEL, 2 mi E of
Chatsworth, Ga, tale, scapstone
Prod: 200 tons
Mine Supt: Garvin Swanson
250-TON MILE, Chatsworth
Mill Supt: James Johnston
Mill Foreman: Walt Weaver-

GLIDDEN COMPANY Lenoir, N C MINE, Lenoir, ilmenite PLANT, Baltimore, Md © (See Calif & Central) GRAVES-ACREE MNG CO Cedartown, Ga MINE, 2 mi W of Cedartown, Ga, Fe Frod: 200 tons GRAV MILL

HARSH PHOSPHATE CO Arlington Ave, Nashville 10, Tenn-Gen Mgr. M G Harsh Sec: T L Hareh MINE, 8 mi SE of Nashville, surface, phosphate rock Prod: 125 tons

HIGHLAND MINING CORP Centerville, Tenn Pres & Gen Mgr: Bill Davis VP: D Brown Bee: M Egrown HIGHLAND MINE, Centerville, surface, phosphate rock Pred: 700 tons

HODGE MINING CO
118 W Cherokee Ave, Cartereville,
Ga
Owner: J W Hodge
Sec: M T Shaw
HODGE MINE, 14 mi w of Cartersville,
Fe
Prod: 878 tons
Supt: Clyde Shaw
MINE, Bartow Co, surface, Fe
MINE, Bartow Co, surface, Fe

HOWARD PHOSPHATE CO Bee 3028, Orlando, Fla Gen Mgr: R M Howard MINE, inverness, Fla, surface, 300-ton butket dredge, soft, colloidal & hard phosphate Mine & Mill Supt; W E Marlow

HUBER, J M CORP, CLAY DIY Langley, S Carolima Pres: H W Huber Exec VP: R B Takewell VP, Clay Div: W J Driver MINE, Langley, surface, clay Mgr: C H Marvin, Jr MINE, Huber, Ga, surface, clay Mgr: P L Couriney PL, Granitaville, S Carolina Comb Prod: 1,000 tons (See East)

HUMPHREYS GOLD CORP
910 First Matl Bank Bldg
Denwer 3, Colorade
Pres: A E Humphreys
VP: Is Humphreys
VP: Is Humphreys
VP & Treas: JS Hubbard
VP & Counsel: Wm C Carton
TRAIL RIDGE PL, P O Drawer 631,
Btarke, Ela, 7 mi 5E of Starke,
ilmenite, sircon, staurolite
Pl Mgr: E C Weichel, Jr
Gen Supt: W J Siprelle
Gen Asst Supt: E S Beebe
Tech Supt: U J Siprelle
Gen Asst Supt: E S Beebe
Tech Supt: J C Detweller
Mine Engr: C J Bastede
23, 600-TON MILL, wat grav
concen & dry else high-tension
A magnet concen
JACKSONVILLE PL, Box 5482,
Jacksonville 7, Pla, E mi E of
Jacksonville 7, Pla, E mi E of
Jacksonville 7, Pla, E mi E of
Jacksonville Prod: 8,000 tons
Pl Mgr: Frank M McKinley
Gen Supt: Homer Lewis
Asst Gen Supt: A D Whisler
Engr: Jack Elladge
Comp: B L Jackson
8,000-ToN GIAV MILL, dry else
high-tension & magnet concen
HIGHLAND PL, Drawer 631, Starke,
Fla, 1/2 mi NE of Lawley, Fla
Comet Supt: C J Bastedo
Under devel

INDUSTRIAL MINERALS INC York, S.C. Pres & Gen Mgr: L.G. Wilece VP & Sec: W.F. Wilson KINGS CR. MINE, 14 md of York, ourface, barite Prod: 15 tons KINGS CR. MILL., 45-ton, crush & gried

INTERNATL MINERAL & CHEM CORP Smithville, Miss MINE, Smithville, earf, benionite Mine Supt. M Clay Mgr: I L Greene Joo-TON MILL, grinding & pulverising FELDEPAR MINES, MC, Tenn, Ve PROSPHATE MINES, Fla, Tenn (See Aris, Cole, III, Mont, New Mez, S Dait, Wyo, & East)

JEFFERSON LAKE
SULPHUR CO
1408 Whitey Bidg, New Orleans
La.
Press: EH Walet, Jr
VP: H A Wilson
VP & Sec: Chas J Ferry
STARKS DOME, Calcasieu Parish,
La, 8.
(See Texas)

RELLOGG CO 930 Franklin St, Ocala, Fla PHOSPHATE MINE

KENTUCKY PLUGRSPAR CO Marion, Ky VP & Gen Gr: R N Fraser MINE, Marion, CaF2

KIBLER-CAMP PHOSPHATE ENTERPRISE Ocals, Fia Gen Mgr: D B Kibler, Jr SEC 13 MINE, Dunnellon, Fia, surface, hard rock phosphate Supt: T D Pelton Asst Supt: N T Farrell Prod: 6,000 tons per month

KINGS MT MICA CO, INC
Box 709, Kings Mt, N C
Pres: James B Preuton, Jr
FP: F B Hendricks
See: Hamilton Douglas, Sr
Treas: Roy H Gunter
PI Supt: Paul A Lancaster
Maint Supt: Marvin W Lancaster
CR Elec: James E White
PATTERSON MINE, 3 mi NW of
Kings Mt, surface, mica
Prod: 400 tons
400-TON MINE

LONCALA PHOSPHATE CO Box 335, High Springs, Fla PHOSPHATE MINE

MARIMEX PLUORSPAR CO.,
INC.
Marion, Ky

Sper; Wm Howard Crider
MCNEELY MINE, Fredonia, Ky,
2 mi NE of Fredonia, undergd, CaFg
Mine Supt: Redge Winters
Agat Supt: Dave Winters

MINERAL MINING CORP Kerehaw, S C Pres & Mgr: P C Bingham MINE near Kerehaw, mica

MINERAL PROD CONP BOX 117, Rockford, Aia VP: Robt Russell PROS PECTS CLAIMS, mear hitchell Dam, Coosa Co, graphite PILOT MILL near Rockford

MONSANTO CHEM CO
Columbia, Tenn
MINE, 8 misW of Columbia,
surface, dragline excav,
phosphate
Gen Mgr, Phoe Div: J L Christian
Plurch Agt: E L Banderlin
Plungr: E J Book
Mine Supt: H A Webster
Asst Supt: E W Miles
Engr: R B Shaffer
Mech Engr: W C Robbins
Elec Engr: R L Van Foesen
Bafety Engr: A N Allen
CRAV-MILL
LEC FURN, 25,000-kw, yellow
phosphorus
PLANT, Anniston, Als
(ives ids. Mo)

NATIONAL GYPSUM CO Kimbaliton, Va MINE & PLANT, undergd, limestone Pl Mge: Monroe Rule Mine Supt: James Huffman (See Mich, Tex, Central & East)

NEW JERSEY ZINC CO Austinville, Va BERTHA MINERAL DIV MINE, Zn, Fb 3, 000-TON FLOT MILL Supt: W L Albers (See Colo, New Men, Wisc & East)

NORTH CAROLINA
FELDSPAR PROD CO
Erwin, Tean
Bill, dry grinding, feldspar

OWENS AG PHOS CORP Centerville, Tenn PHOS PHATE MINE

OLD DOMINION MANGANESE
CO. INC
Shar Tannery, Va
Pres: John B Lewis
VP: Paul J Bertelsen, R C Stephenaon
Sec: Craigh Leonard
Gen Supt: Trice Carter
MINERAL RIDGE, 8 mi S of Star
Tannery, Va, undergd, surface, Min
HEAV MEDIA MILL, Mineral Ridge

PENNSYLVANIA SALT MFG CO Marion, Ky 100-TON FLOT MILL, Mexico, Kentucky (Hee East)

REPUBLIC STEEL CORP
Hirmingham, Ala
EDWARDS MINE, Birmingham,
unidergd, Fe
Prod: 900, 000 tons per year
Mgr: B H McCrackin
Bupt: B C Jones
Else Engr: R B Watt
Maint Engr: E Read
BPAULDING MINE, Birmingham,
undergd, surface, Fe
Prod: 400, 000 tons per year
Supt: J G Blackwell
GRAY CONC
Prod: 380, 000 tons per year
BLAST FURNACE, E Thomas, Ala
BLAST FURNACE, E Thomas, Ala
So Dist Mgr: E I Evans
(See Mich, Minn, Central & East)

REYNOLDS MINING CORP
Reynolds Metals Bidg,
Richmond, Va.
Ch of Bd: RS Reynolds
Pres: Walter L Rice
VPs: M M Caskia, RS Sherwin,
R H Zeglin, J Louis Reynolds
Treas: RS Reynolds, Jr
Sse: Allyn Dillard
Ch Geoi: John D Moses
Bafety Engr: J& Nichole
Furch Agt: M W Henry
(See Colo)

RIVER & RAIL PHOSPHATE CO 139 2nd Ave N, Nashville, Tenn Pres & Gen Mgr: L H Jordan Sec: 3 E Wheeler Gen Supt: Claude Warren MINE 8 mi NW of Nashville, Tenn, eurface, dragline, raw phosphates, Idle PLANT, Jordonia, Tenn

ROBERTS & FRAZER Marion, Ky MINES, Livingston Co

RUTILE MNG CO OF PLA II Broadway, New York 6, NY MINE, S Jacksonville, Fla, surface, rutile, zircon, ilmenite Prod: 150 tons (Lessed to Humbhreys Gold Corp)

SCHROEDER CO
McGregor, lowa
Pres: E C Schroeder
VP: Paul E Schroeder
Sec: Volet M Schroeder
Gen Supt: J B Baker
BELGREEN MINE, Russeliville,
Als, 12 mi W of Russeliville,
aurface, iron ore
Mine Supt: I W Nading
HEAVY MEDIA MILL.

SEA BOARD PHOSPHATE CO Dunnellon, Fla PHOSPHATE MINE

SHOOK & FLETCHER SUPPLY CO 1814 let Ave, Birmingham, Ala Pres: PG Shook VP: JW Shook Gen Mgr. AM Shook III Sec: JH Adkins Purch Agt. LM Quick ADKINS, WARNER & BLACKBURN MINES, Russellville, Ais, surface, Iron ore Supts: Edmond Craddoch, E N Vandegritt

SOIL BUILDERS, INC Dunaellon, Fla PHOSPHATE MINE SMITH-DOUGLAS CO, CORONET DIV Norfolk, Va Actg Pres: JR Sheffield Gen Supt: BG Dabney TENOROC MINE

SOUTHEASTERN CLAY CO Alben, S C MINE, keolin

SOUTHERN MICA CO
Johnson City, Tean
Pres & Gen Mgr. C Balley Rice
VF & Gen Supt. J F Reynolds
Sec. Wands H Hannett
SOUTHERN MICA CO OF N C, INC,
Newdale, N C, 8 ml W of Spruce
Pine, surface, mács
Pred: 50 tons
Mine Supt. George W Edge
49-TON GRINDING MILL,
Johnson City

STARRETT & LETT Pyciton, Ala HURST MINE, Clay Co, trimmed & sheet mica

SUPERIOR PHOSPHATE CO Box 676, Dunnellon, Fla PHOSPHATE MINE

SWIPT & CO US Yards, Chicago, III PHOSIPIATE MINE, Agricola, Pla WATSON MINE VARN MINE

TENNESSEE COPPER CO
Copperhill, Tenn
BURRA BURRA, BUREKA, BOYD,
CALLOWAY & MARY MINES,
Au, Ag. Cy, Zn. FeProd Mgr: C H McNaughton
Supt: N F Kendail
3,000-TON FLOT MILL
Prod: 1,000,000 tons per year
Supt: F M Lawie
(See East)

TENNESSEE VALLEY
AUTHORITY
Knowwille, Tenn
Gen Mgr. John Oliver
Gen Supt. H R Moeley
Geol: R S Ingte
Mech Engr. Henry T Puts
Safety Engr. J M Sieson
KNOB CREEK, Columbia, Tenn,
3 mi N of Columbia, surface,
phosphate
Prod. 500 tons
Mines Supt. Chas A Irwin

THOMPSON WEINMAN CO Cartereville, Ga BARITE MINE

TONCRAE MNG CO, INC
2811 Greenlawn Ave, Wman Rd,
Roanoke, Ya
Pres & Gen Mgr: C H Thompson
VP: W J Durkin
Sec: Leo Howard
Purch Agt: C H Thompson
TONCRAE PI MINE, Rt 6, Floyd,
Va, Cu, Fe
Supt: H C Barmon
Asst Supt: Robt Conner
Foreman: Oscola Pratt
ROASTING, LEACH & PRECIP
PLANT
Prod: 60 tons

TUNGSTEN MMO CORP
Box 81, Henderson, N C
Gen Mgr: JR Sweet
Awel Gen Mgr: D B Bailey
Ch Engr: A M Baymhlewski
Master Mech: W F Edwards
Purch Agt: G V Boyd
HAMME MINE; undergd, WOg
Proof: 808 tows
Mine Supt: J C O'Donnell
Mine Foreman; E H Roberts
Mine Engr: R M Richmond
700-TON ORAV-FLOT MILL,
Tungsten, N C
Mill Supt: J V Hamme
Mill Foreman: B Lee Angel
Assay: S B Adams
(See Ease)

U S GYPSUM COMPANY
Plasterco, Va
Gen Mgr. Bi D Decker
NUMBER SUX MINE, at Plasterco,
undergd, gypsum
Pyod: 800 toos
Mine Supt: R C McNamee
Mine Foreman: D R Davis
(See Calif. Colo, III), Mich, Mont, Nev,
Utah, Wash, Central & East)

U S PIPE & FOUNDRY CO
Birmingham, Ala
Pres: C S Lawson
VP: Fred Oxborne
Gen Mgr: Eugene Coeiner
Met: R H Stacey
Elec Engr: L E Shiffman
Sec: J W Brennan
Gen Supt: L E Shiffman
Sec: J W Brennan
Gen Supt: J W Nicol
Geol: Jack Morris
Meth Engr: W L Adamson
Safety Engr: J A Downey
Purch Agt. H E Cross
RUSSELLVILLE MINE, 3 mt E
of Russellville, Ala, surface, Fe
Prod: 780 tons
Mine Supt: S A Britton
Ast Mine Supt: S A Britton
Ast Mine Supt: S A Britton
HEAVY MEDIA MILL,
Prod: 890 tons of limonite per day
BLAST FURNACE, Birmingham
Supt: Dan Watkins
Asst Supt: Geo Routledge
RUFFNER F2 MINE, Irondale,
Ala, 7 mt E of Birmingham,
undergd, iron orre
Prod: 750 tons
Mine Supt: P M Casidy
Mine Foreman. Wm Sainris
Mine Engr: Geo Jones
HEAVY MEDIA MILL, 1,600 tons
of hematite per day
Mill Supt: C M Elieberry
Assayer: P M Wallcott
SLOSS #2, Bessemer, Ala, 12 mf
W of Birmingham, undergd, Fe
Prod: 1,000 tons
Mine Supt: J W Russell
Asst Supt: J W Russell

U S STEEL CORP
TENNESSEE COAL & IRON DAY
BOX 599, Pairfield, Ala
Pres: A V Wichel
Exec VP: John Pagsley
VP of Oper: J M Spearman
Mgr. Raw hast: R E Kirk
Ch Engr. Raw Mast: B E Michaelson®
Turch Agt: L C Teague
IRON ORE MINES & COND PL.,
8 undergd mines near Beasemer, Ala
Cap: S, 661, 000 net tons crude iron
ore per year
Gen Supt: A W Beck, Jr
Aset Gen Supt: J G Crevelling
Supt, Muscoda Div: G M Neal
Supt, Wenonah Div: P J Zukow
Supt, Wenonah Div: P J Zukow
Supt, Cre Cond Pl: C E Lacy
ZINC ORE MINE & FLOT MILL,
Jefferson City, Tenn
MINE, undergd
Cap: 480, 000 net tons crude
sinc ore per year
WILL
Cap: 30, 000 net tons crude
sinc ore per year
WILL
Cap: 30, 000 net tons Zn Concen
per year
Gen Supt: Frank B Brophy
Supt of Mine: J A Miller
Mine: Mine: Miller
Mine: Mine: Mine: Miller
Mine: Mine: Mine: Miller
Mine: Mine: Mine: Miller
Mine: Mine:

VICTOR CHEMICAL WORKS Tarpon Springe, Pla ELEMENTAL PHOSPHATE PLANT (See Calif, Mont, ill & East)

VIRGINIA - CAROLINA
CHEM CORP
Bos 197, Richmond 14, Va
Pres: JA Howell
VP: C E Heinriche
TENN MNG DEPT, Mt Pleasast,
Tenn, surface, dragline, phoe
Mgr: R J Grissom
PLORIDA MNG DEPT, Nichots,
Fla, phosphate
Mgr: H L Pasce

WILSON, D M Eufaula, Ala BAUNITE MEVE

WOOD, L A Sweetwater, Tenn BARITE MINE WOODWARD IRON CO
Woodward, Ala
Pres: John E Urguhart
VF: Hewitt Smith
Sec: D T Turnbull
Gen Supit: John Hager
Met: F U Leonard
Safety Engr: Stanley Mooney
Purch Agt: H K Stokee
PYNE MINE, 6 mls of
Bessemer, undergi, iron ore
Mine Supit: T W Davis
Asst Mine Supit: W H Thompson
Mine Engr: S E Sullivan
BLAST FURNACE, Woodward
Prod: 772,632 net tons per year
Supit: J B Casey
Asst Supit: C Y Huff

YACKIN MICA &
ILMEBITE CO,
(Div of the Glidden Co)
Box 615, Lenoir, N C
Gen Mgr: N L Rhodes
MINE, surface, limente
100-TON GRAY MSLL
(See Glidden, South, Central
4 Calif)

ZONOLITE COMPANY Travelers Rest, S C STRIP MINE, surface vermiculite Mgr: J A Kelley (See III, Mont)

EAST
CONN, DEL, MAINE, MD, MASS,
N H, N J, N Y, PA, R I, VT, W VA --

ALAN WOOD STEEL CO
Conshohocken, Penn
Press: JT Whiting
VP: C E Davis
Sec: C L Jones
Met: E W Earhart
Elec Engr: A D Howry
Mach Enge: F C Schoen
Safety Engr: C D Dorworth
Purch Agt: Clainon Bishop
SCRUB OAKS MINE, Dover, N J,
undergd, Iron
Prod: 3,000 tons
Mine Supt: W P Schenck
Mine Foreman: Chas Weller
Mine Engr: Walter McDougal
3,000-TON MAG-GRAY MILL, Dover
Mill Foreman: Harry Hendershot
BLAST FURNACE, Conshohocken
Supt: E J Wellsh
WASHINGTON MINE
Supt: Wilfred Keats

ALCOA MINING CO. PLUORSPAR DIV 1501 Alcos Bidg. Pittsburg 19, Pa VP in Chg: A B Williams Works Mgr. W Sikeels (See Ill, South & Oregon)

ALLIED CHEM & DYE CORP, GEN CHEM DIV 40 Rector St, New York 8, N Y Pres: 46 M Biddison VP: C M Brown Mgr, Mng Oper: R H Dickson Aust Mgr, Mng Oper: W J Tripp Geol: E J Langey Dir, Purchasee: F J French (See Colo, New Mex, Central & South)

AMERICAN AG CHEM CO, INC 50 Church St, New York, N Y

AMERICAN CYANAMID
36 Rockefeller Plaza
New York, N Y
(See Central & South)

AMERICAN MACH & METALS, TROUT MNG DIV 233 Broadway, New York, N Y Pres: J C Vander Pyl VP: C W Anderson Sec: F C Kealing Treas: H T McKeekin (Sew Mocrana)

(See Montana)

AMERICAN SMLTG & REFIN CO
120 Broc. Sway, New York, NY
Ch of Bd: Roger W Straus
Vree: KC Brownell
Ch of Fin Com: J C Emison
VPS: E L Newhouse, J, R F Goodwin,
JD MacKensie, S D Strause, R D
Bradford, S H Levison, R W Vaughan,
A J Phillips
Treas: O S Straus
Sec: G A Brockington

SMELTING & REF DEFT
Asst to Pres: E P Reese, Jr
Mgr. Ore Purch Dept: E L Jourdan
MINIMO DEFF
Asst to VP: D J Pops
Res Engre: V I Mann, C E Prior,
L H Hart
PURCHASING DEFT
DIr: F H Eichler
TEAFFER DEFT
Mgr: D B Slake
BALTIMORE PLANT, Beltimore, Md
Mgr: J G Leckie
CUFFER SMELTESG
PERTH AMBOY PLANT, Barber, N J
Mgr: K Harms
COPPER SMLTG, CONV & REFIN,
LEAD SMLTG & REFIN
(See Aris, Colo, Calli, Ids, Ill, Mont,
New Mox, Tex, Utah, Wash & Central)

AMACOMDA COPPER MNG CO
28 Broadway, New York, N Y
Ch of Bd: C F Kelley
Press: R E Dwyer
VF in Chg of Oper: C E Weed
Exec VP: E S McGlone
VP & Gen Counsel: R H Glover
VP, Mng Oper: R S Newlin
VP, Met Oper: Frederick Laist
VPs: E O Sowerwine, C H Steele
Compt: W Daly
Sec & Tress: C E Moran
Ch Geol: V D Perry
(See Calif, New, Mont, Ida, Utah & Wash)

ABBLEY MINING CORP
West Rumney, N H
Pres: H A shiey
VP & Engr: E M Shipp
BERYL MT MINE, Acworth, N H
& MINES in Grafton Co.,
feldepar, mics, quarts, columbite

BARTON MINES CORP N Creek, Warren Co, N Y Press: H Barton VP & Mgr: H H Vogel Prod Mgr: C R Barton Gen Supri; Howard Waldren Purch Agt: T Leonaerd OARNET MINE, near North Creek, surface Prod: 400 tons Mine Supt: S Brown HMS GRAV-FLOT MILL.

BETHLEHEM CORNWALL
CORP
Tole Third St, Bethlehem, Pa
Pres: A F Peterson
Mgr: S J Shale
CORNWALL MINE, Cornwall, Pa
Fe, Cs, Au, Ag, S
6, 000-TON MAG CONC
2, 500-TON FLOT PL
2, 000-TON SINTERING PL
GRACE MINE, Morgantown, Pa,
Fe, S
MAG CONC, FLOT PL, pelletising
clant

BUTTE COPPER & ZINC CO 25 Broad St, New York, N Y Pres: A A Shelare VP: M F McConsid Sec. J F Cole (See: Mumiana)

CALLAHAN ZINC LEAD CO
100 Perk Ave, New York, N Y
bress J T Hall
VP: R F Mahoney
Sec-Treas: E A Salo
(See Alasm, Colo, Idaho & Nevada)

CAMP BIRD, LTD
49 Moorgate, London EC3, England
70 Pine St, New York, N Y
Chmn: F C Heley
CAMPBIRD MINE, Ouray, Colo, Pb,
Zn, Cu, Au, Ag
(Under lease to King Lease, Inc.)

CARBOLA CHEM CO, INC
Natural Bridge, N Y
Pres: C J Zimmermann
Gen Mgr: C J Zimmermann
Asst Mgr: H T Koenig
Gen Supt: Phil BlasovicPurch Agt: C R Redmond
CARBOLA MINE, Natural Bridge,
undergd, limestone
Frost: 1032 tess
Mine Foreman: Alfred Loso
Mine Engr: Phil Blasovic
150-TON FILOT-GRAV MGLL
Mill Supt: Donald Donaghy

CASTLE DOME COPPER CO, INC * (See Copper Cities Mng Co in Aris)

MINING WORLD

CERTAIN-TEED PROD CORP CERTAIN TEED PROD CORP 120 E Lancaster Ave, Ardmore, Pa Pres: Rawson G Lizare VPs: P E Pischer, C K Hobson, J R Johnston, M Meyr Asst VP: A R Crawen Sec: Arthur O Graves Purch Agi: J I Trolley CERTAIN-TEED MINE, Clarence, NY, undered. pressum undergd, gypsum (See Mich, Tex, Utah & Central)

CLIMAX MOLYBDENUM CO
500 Fifth Ave. New York 36, NY
Pres: A H Bunker
VP: C M Loeb, Jr
VP & Treas. W G Thomas
VP: A Lowan
REFINERY, Langeloth, Pa,
Supt: J H White, Jr
Asst Supt: E S Wheeler
Prod: 2,000,000 lbe MoS2 per me
CSEC Cusion

CLIMAX URANIUM CO, SUBSID OF CLIMAX MOLYBDENUM CO

CO
500 Fifth Ave, New York 36, NY
Pres: C L Wilson
VP & Gen Mgr: M L Kay
Treas: W MacGregor
See: L A Cowan
Aest Gen Mgr: #J Duggan
Met: W Knott
Mech Engr: I W Andrews
Purch Agi: R Gough
(See Cold)

CLINTON MET PAINT CO Clinton, N Y Asst Treas: D Muir MINE, Clinton, hematite

CONSOL COPPERMINES COMP 120 Broadway, New York 5, N Y Pres: C D Tripp VPs: C F Leaman, C L Steegar Gen Mgr: A J O'Connor (See Newada)

COPPER RANGE CO
24 Federal St, Boston 10, Bass
Pres: M F LaCroix
VPs: J F Lally, P F Beaudin,
R W Myers, John V O'Conner,
H B Eweilt
Treas: D M Goodwin
Compt: Robt McArthur
Sac: J R Ackroyd
C G HUSSEY & CO DIV
VP & Div Gen Mgr. J F Lally VP & Div Gen Mgr: J P Lally VP: R W Myers
Purch Agt: JG McNeely
Sales Mgr: E H Selling
Credit Mgr: Wm Glenn
F1 Supt: C E Fearl Ref Supt; James Malok Mast Mech: Andrew Herpak Ch Elec: C H Wilson

CROUCH MNG CO, SUBSID OF GEN ABRASIVE CO,

Drawer D. Heidge Station. Drawer D, Hevidge Station,
Niagara Falls, N Y
Pres: Alan V Parker
VP & Gen Mgr: Robt MacDimald, Jr
VP; JS Tomidnson
Geoit L M Richard
Elec Engr: O J Carpenter
See Contrail Elec Engr: (See Central)

DAVISON CHEM CORP, THE 101 N Charles St, Baltimore 3, Md Ch of Bd: C F Hockley Pres: M G Geiger Dir of Chem Oper: F C Nicholson

DOMINION MANGANESE CORP 135 Broadway, New York 6, N Y Pres: Alexander C Barker VP: J van Tijn Sec: Emil L Feigenbaum (See South)

DU PONT de NEMOURS, E 1 & CO Pigments Dept, 1007 Market St, Wilmington, Del (See Humphreys Gold Corp, South)

EASTERN MAGNESIA EASTERN MAGNESIA
TALC CO, INC
206 Bank St, Burlington, Vt
Pres: E. W. Magnus
VP & Ch. of Bd: John Patrick
Gen Supt: V. A. Backels
Engr: L. H. Durkee
NO 2 MINE, 2 mi S of
Waterbur, Vt. undered, tale. Waterbury, Vt, undergd, talc Prod: 100 tons

Mine Supt: Maurice G Eastman Mine Foremas: Earl Clifton 180-TON DRY GRINDING MILL 800-TON DRY GRINDING MILL.
800 4 MINE, 5 1/2 mi N of
Johnson, Vi, undergd, tale
Prod: 100 tons
Mine & Mill Supt: Roger W Perkins
Mine & Foreman: Cliff Allen
100-TON PLOT-DRY GRINDING MILL.
MIR Furwans: Alden Sargent

EBSARY GYPSUM CO, INC
Powers Bidg, Rochester 14, NY
Pres: Frederick G Ebsary
VP A Gen Mgr: C M Winslow
Sec: Mary E McConville
WHEATLANE MINE, Wheatland
P O Caledonia, N Y, under gd, gypsum
Mine Sayl: Francis Hammand
Mine Forenant Earl Scharina Mine Foreman: Earl Scharies

EMPIRE STAR MINES CO, LTD 14 Wall St, New York 4, N Y Pres; JR Mann Sex: John E D Grunow Treas: Walter P Schmid Gen Mgr: H R Fitspatrick Purch Agt: Wan Carmen (Sec Calif)

FOOD MACH & CHEM CORP WESTVACO CHEM DIV 405 Lexington Ave, New York, N Y (See Calif, Nev & Wyo)

PREEPORT SULPHUR CO FREEPORT SULPHUR CO
161 E 46nd St, New York 17, NY
Frws: Langbourne M Williams
YP's: R K Shirley, P E Neaman,
Z W Bartlett, J C Carrington,
R C Hills, R B Johns, H C Petersen,
T R Vaughan, R C Wells
VP & Gen Mgr: E D Wingfield
(See Tex, South)

GENERAL ABRABIVE CO INC GENERAL ABRABIVE C. Nisgara Falls, N Y Fres: A V Parker VP: R MacDonald, Jr Gen Mgr: L M Richard (See Crouch Mng Co, Central)

GOLDING KEENE CO

Box 2151, Trenton 2, N J

COLONY & KIDDOR MINES,
Alstead, N H, feldspar, mic
quarts

GOUVERNEUR TALC COUVERNEUR TALC
CO, INC
Box 89, Gouverneur, NY
Press: R T Vanderbilt
VP & Sec: F B Vanderbilt
WP & Sec: F B Vanderbilt
Mech Enge: J H Hery
Safety Engr: D A Foster
Purch Agt: K J Miles
MINE, 8 mi SE of Gouverneur,
undered. tale mine, em se o converne undergd, taic Mine Supt: J Bulgar Mine Foreman L Typhair Mine Engr: GErdman 250-TON DRY GRIND PL Mill Supt: J Hery Asst Supt: B Boulet

GRAPHITE MINES, INC Box 92, Auburn Station Cranston, R I-Treas: P T Kaine OPERATIONS, Providence Co,

GREAT LAKES CARBON CORP
18 E 48th St, New York, N Y
(See Colo, Calif, Nev, New Mex & Ore)

GREER LIMESTONE CO
Box 844, Morgantown, West Va
Gremer: Greer Steel Co
Gen Mgr: P A Wadsworth
MINE, 10 mi E of Morgantown W Va, Mine Supt: Wade Hurns
Mine Supt: Wade Hurns
Mine Foreman: Frank Pirlo
Prod: 800 tons
800-YON MILL

HARTFORD TALC & QUARTZ CO Bel Air, Md MINE, Duablin, Md, talc &

HOWE SOUND CO 730 Pifth Ave, New York, NY (See Howe, Wash, Calera, Utah &

HUBER, J M CORP Sales Off: 100 Park Ave New York 17, NY Pres: H W Huber

INSPIRATION CONSOL COPPER CO 28 Broadway, New York 4, NY Pres: R 8 Newlin VP 4 Gen Mgr: P D 1 Honeyman Sec-Treus: H M Jacob Pers Mgr: L E Caldwell Auditor: E M Bredwell (See Arise

INTERNATE MIN & CHEM CORP PELDSPAR MINES Maine, New York & New Hampshire (See Aris, Colo, Mont, New Mes, 5 Dak, Wyo, Central & South)

INTERNATE SALT CO. INC Reteof, N Y Pres: E L Fuller VP: H M Griffith VP: H Osborn RETSOF MINE, 4 mi S of Geneseo, RETSOF MINE, 4 mi s of N Y, underled, rock salt Gen Mgr: T F Courthope Purch Agt: J A Cooney Pl Mgr: S Martin Mech Engr: R Goetz Elec Engr: D L Moynes

INTERNATE SMLTO & INTERNATL SMLTG &
REFIN CO,
A SUBSID OF ANACONDA
COPPER MNG CO
25 Broadway, New York, N Y
Pres: C F Kelley
VPs: Frederick Laist & E O Sowerwine
Sec-Treas: C E Moran
Compt: W K Daly
RARITAN COPPER WORKS,
Perth Amboy, NY
PERTH AMBOY SMELTER, Cu

INTERNATL TALC CO, INC Box 298, Gouverneur, N Y Pres: R H McCarthy VP: S w Tuttle Gen Mgr: F G Kuehl Elec Engr: Glenn Poole Purch Agt: E G Rogers WIGHT, FREEMAN & #3 MINES, tale
Prod: 300 tons
Mine Supt: Geo Hurley
Mine Engr: Max Tesamer
300-TON TALC MILL, Hailesbor, N Y. Mill Supt: C F Dievendorf

JOHNS-MANVILLE
22 E 40th St, New York 16, NY
Ch of Bd; L M Cassidy
Pres: A R Fisher
VP: K W Huffine
Purch Agt: S F Curtis
(See Calif)

JONES & LAUGHLIN STEEL

JONES & LAUGHLIN STREET
CORP
401 Liberty Ave, Pitteburgh, Pa
Gen Mgr, Ore Mines: C C Henning
NEW YORK ORE DIV
BENSON MINES, 32 mi E of
Gouverneur, NY, surface, Fe
Mgr: W R Webb
Anet Mgr: R G Flack
Geol: Fred Weat
Mg Engr: Einar Smeby
Ree Engr: Carl Djuvik
Indus Engr: Dave Richardson
Safety Engr: Ray Wagner
Gen Forerman: W P Bach
Ch Elec: R F P Starson Ch Elec: R F Peters Ch Elec: R F Peterson
Mast Mech: P L Versteeg
CRUSHING PL & CONC
Gen Foreman: W A Vickers
SINTER PLANT
Gen Foreman; Ralph West
(See Mich, Minn)

KENNECOTT COPPER CORP Pres: C R Cox
VP, West Mng Divs: J P Caulfield
VP, Explor: Anton Gray
VP, Legal: R C Klugescheid
VP, Research: Leslie G Jenness
VP: Frank R Milliken
Tress: E S Hann
Sec: Robt C Swilivan
Compt: G B Russell
Div. Fac. FW Chambers Pres: CR Cox Dir, Eng: F W Chambers Dir, Ind & Pub Rel: A S Cherouny

Gen Furch Agt: R P Lambor Gen Traffic Mgr: R E Taylo (See Aris, Nev, New Mex & U

MEADOWBROOK CORP, SUBSID OF MATTHESSEN & HEGELER ZINC Pres: HD Carvs VP & Gen Mgr: H A Gronemeyer VP: A C Carvs Assi Cen Mgr: T R Ferguson Sec: C R MacBrayne

MIAMI COPPER CO 61 Broadway, New York 6, N Y Pres: E H Westlake VP & Treas: John G Greenburgh VPs: M A Caine, J H Polliott Sec: Henry Kaufn (See Arisona)

OO THOMP

OF AMERICA

SOO FITH Ave, New York, N Y
Head Oper Office: Washington, Pa
Grant Blidg. Pittaburgh, Pa
Pree: Marx Hire
Exec VP: Emil A Lucas
Works Mgr: E F Lucas,
Washington, Pa
William F Allen, York, Pa
Sec: James S Crawford
Treas: William E Kunts
Mets: E F Lucas, Norman Tiadale, Sr.,
Norman Tiadale, Jr., William G Wilson
Mech Engr: Alan Harju
(See Calif, Colo, New Mex) Mech Engr: Alan Harju (See Calif, Colo, New Mex)

NATL GYPSUM CO NATL GYPSUM CO
325 Delaware Ave, Buffalo 2, N Y
Ch of Bd of Dire: M H Baker
Pres: L R Sanderson
VP, Operations: F A Manske
VP, Manus: W F Anderson
Treas: W W Corrie
See: D B Littlewood
Controller: R H Means
Dir of Purch: E T Obenchain
Ch Engr: 5 D Skinner
Supervisor, Mince & Quarries:
R H Sturgess
Dir, Safety: M C M Pollard
Mink & PLANT, Clarence Center,
M Y, gypsum MINE & PLANT, Clarence Center W Y, gypsum Pl hggr: L H Seufert Mine Supt: L S Liles QUARRY & PL, York, Pa, lime Pl Mgr: W W Wallace Quarry Supt: C E Teenow MINE, Bellefonte, Pa, limestone Pl Mgr: W E Quarters Pl Mgr: H E Gustafson Mine Supt: JR Carlson (See Mich, Cent, South)

NATL LEAD CO NATL LEAD CO
III, Broadway, New York 6, N Y
Pres: J A Martino
Yes: J A Martino
Wildner
Mgr, Mng Dept: Gloyd Wilee
TITANIUM DIV
MacINTYRE DEVEL, Tahawus,
30 mi N of North Creek, N Y, so mi N of North Creek, N surface, Ti, Fe Fl Mgr: P W Allen Aset Pl Mgr: JA Poll Purch Agt: Leon de Polac Gen Supt: C R Begor, Jr Mine Supt: C R Begor, Sr Geol: John Holland 4,000-TON GRAY-FLOT-MAG REELL Supt: J J Strohl Foremen: W P Jenkins, E Gero Supi: J J Strohi
Foremen: W P Jenkins, E Geroux
Assay: H M Davies
THREE PAN GREENAWALT
SINTERING
Pl Supi: R A Kingman
Prod: 4,000 tons
(See Calif, Mo, New, Texas, Central)

NEW JERSEY ZINC CO NEW JERBEY ZINC CO
160 Front St, New York 38, N
Chof Bd: H Hardenbergh
Pres: R L McCann
YP: S B Goodwin
Gen Purch Agt: W J Led
MINES, Franklin & Ogdensburg,
S J. Zn. MAG & GRAV MILLS
Gen Supt: W F Evans
(See Colo, New Mex, Wisc, & South)

MEW YORK-ALASKA GOLD DREDGING CO 41 Broad St, New York, N Y (See Alaska & Wash)

NEWMONT MNG CORP 14 Wall St, New York S, N Y Pres: P Maloyemoff VPs: Philip Kraft, M D Banghart Sec: Carroll Searia Met: F W McQuieton Elec Engr: E T Tucker (See Empires Star Mines, Calif & East; Idarado & Resurrection, Colo; Goldfields Deep Mines, Nev; Magna Copper, Ariz)

MORTON CO

1 New Bond St, Worcester, Mass
Press M P Higgins
Exec VP: R.F Gow
Treas: W J Magge
Seoi: M N Plisworth
Elec Engr: K 5 Person
Safety Engr: N P Ingalls
Purch Agt; G D Seguin
Gsec Central)

OZARK-MAHONING CO, MNG DIV Box 2032, Wilmington, Del PLUORSPAR FH.TER CAKE DRYING PL. Supt: W V Kuster (See Colo, New Mex & Central)

Gee Colo, New Mex & Central)

PHELPS DODG CORP
40 Wall St, New York S, N Y
Ch of Bdi L S Cates
Press R G Page
VPs: C E Dodge, G R Drysdale
Asst VP & See: J E Masten
Compt: J M Hawkins
Asst Compt: K A Lawrence,
A F Petersen
Trea & Asst Sec: M W Urquhart
Asst Sec-Treas: R D Barnhart,
H R Dobbs
Gen Purch Agt: F G Lee
Gen Traffic Mgr: J W Lee
Asst Gen Traffic Mgr: J W Lee
Asst Gen Traffic Mgr: B Ponessa
(See Aris, New Mex, Texas)

PHELPS DODGE REF CORP,
SUISID OF PHELPS DODGE CORP
40 Wall St, New York St, N Y
Press: WC Bennett
VPs: C E Dodge, Howard Barkell
See & Counsel: J B Beaty
Compt: T J M Hawkins
Asst Compt: Raymond Soden
Treas: M W Urquhart
Asst Treas: H R Dobbe, R D Barnhart
LAUREL HILL REF & SMLTR,
Laurel Hill, N Y, elec copper,
copper suifate, nickel suifate,
selenium, tellurium
Works Mgr: F W Hichardson
Gwe Taxasi
(Gse Theips Dodge, Aris, New Mex,
East)

POROCEL CORP 210 W Washington Square, Philadelphia 5, Pa (Sec Central)

(See Central)

REPUBLIC STEEL CORP
OLD BED, HARMONY & FISHER
HILL MINES, Mineville, N Y,
undergrd, Fe
Mgr: W J Linney
Asst Mgr: F J Myere
Buyts: J R Brennan, J R Murphy
Engr: W A Blomstran
Maint Supt: M L Desendorf
Ch Engr: A K McGlellan, Jr
Prod: 2,000,000 nons per year
CHATEAGAY MINE, Lyon Mi,
N Y, undergrd & surface, Fe
Mgr: W J Linney
Asst Mgr: W G Crusberg
Supt: Jos Tolosky, Sr
Ch Engr: F J Mc Merosonia
Maint Supt: Howard Figs
Else: Frier-Danisis
Prod: 1,350,000 tons per year
CHATEAUGAY MILL, magnetic
Supt: E R Knox, Jr
Assay: J M Sout
Prod: 305,800 tons conc per year
See Lake Superior & Central)
RICHARD ORE CO.

RICHARD ORE CO. SUBSID COLO FUEL & IRON CORP Wharton, N J RICHARD MINE, near Wharton,. undergrd, Fe Supt: Richard Dockeray
Safety Engr: W P Gelligan
Mine Engr: A J Gotu
Mech Engr: J J Burchko
Elec Engr: George Gawthorn
Elec: Harry Martin
600-TON MAGNETIC MILL
Supt: P W Keim

RINGWOOD_IRON MINES, INC
Ringwood, N J
Pres & Gen Mgr: David & Goodkind
Acat Mgr: R I Goodkind
Sec: C S Stern
PETERS & CANNON MINES, Ringwood,
65 ml NW of NY, Fe
Under devel
Supt: Harold Kramer
1,000-TON MAGN-GRAV MILL
Supt: N & Karchmer
Foreman: W Stephens

RUBEROID CO, THE
SOOTH AND NEW YORK, MY
VERMONT ASSESTOS MINES DIV
Hyde Park, Vt, surface, chrysotile,
subestos
Gen Mgr: MJ Messel
Purch Agt K Foster
VERMONT ASBESTOS MINES,
Hyde Park, sebseios, chrysotile
Supt: Morgan Potter
Engr: John Stewart
MILL, Lowell, Vt, crushing &
sir sep
Supt: Carl White.

ET JOSEPH LEAD CO
250 Park Ave, New York, N Y
Ch of Bel: C H Crane
Pres: Andrew Fletcher
VP & Treas: G I Brigden
Sec: Robt Bennett
EDWARDS & BALMAT MINES,
Balmat, St Lawrence Co, N Y,
undergd, Jos. Pbd. Fe52
ELECTROTHERMIC, Josephtown,
Pa.
Prod: 90,000 tons Zn per year
(Sec Central)

SHATTUCK DENN MNG CORP 120 Broadway, New York 5, N Y Pres: Thomas Bardon VP: 8 5 Shattuck Asst VPs: R J Higgins, T W Newell Sec-Tress: Norman E LaMond (See Aris & New Mex)

SNYDER MINING CO
812 Oliver Bldg, Pittsburg, Pa
Pres: W P Snyder, Jr
VP: H M Wilson
Acut to Pres: A L Fairley, Jr
Sec: L B Perrin
Treas: J K Foster
(See Minn)

SOUTHWEST POTASH CORP 41 Broadway, New York 5, N Y Pres: Heath Steele VPs: John Payme Jr, T O Moore, Thomas Camp Jr & Thomas Childs, Jean Yullieques Chen New Month

STANDARD LIME & STONE Bellefonte, Pa MINE, limestone

TENNESSEE COPPER CO 61 Broadway, New York 6, N Pres: E H Westlake VP & Gen Mgr: T A Mitchell (See South)

TRI-STATE ZINC CO
TO Pine St, New York S, N Y
Pres: C O Lindberg
VP & Gen Mgr: M H Loveman
Sec: J H Nicholle
Asst Gen Mgr: V C Allen
(18sw 111)

TUNGSTEN MNG CORP 500 5th Ave, New York IS, NY Pres: B S West VP; W L Long Gen Mgr: Jrl Sweet Asst to Pres & Sec: H S West, Jr Purch Agt; G V Boyd (Sec South)

U S GYPSUM CO MINE, Falls Village, Conn, surface, limestone MINE, Parnama, Mase, surface, limestone MINE, Oakfield, NY, undergd, gypsum (See Calif, Cido, III, Mont, New, Tex, Utah, Wash, Mich, Central &

U S METAL REF CO
(Controlled by Amer Metal Co, Ltd)
61 Broadway, New York, N Y
Cn of Bd: Walter Hochschild
Pres: Hugo de Neufville
See: T W Childs
VF & Mgr. F H Dyke
Aust Mgr. Douglas Tennant
Purch Agt: Millard Mereill
SMELTER & REFINERY,
Cateret, N J, Cu, Ag, Au
Prod: 144, 000 tons Cu per year
900, 000 or Au per year
900, 000 or Au per year
40, 000 tons misc per year

U S POTASH CO
30 Rockefeller Plata,
New York, N Y
Pres & Gen Mgr. H M Albright.
VP & Gen Counsel: Paul Speer
VP: Thomas M Cramer
Sec-Treas: Walter F Dingley
Asst Sec. Certrude B Stiehler
Controller: J H Madfield
(See New Miss)

U S SMELTING REFINING & MNG CO 75 Federal St (Box 2137) Boston, Mass . Pres: FS Mulock (See Alasha, Artz, Utah & New Mex)

U S STEEL CORP
525 William Penn Place,
Pittsburgh 30, Pa
Ch of Bd of Dirs: B F Fairless
Vice Ch of Bd of Dirs: R M Blough
Ch of Fin Com: E M Voorhees
Vice Ch of Fin Com & Compt: R C Tyson
Pres: C F Hood,
Gen Caunsel: R M Bl ugh
Exec VP-Com: D F Austin
Exec VP-Der: H B Jordan
Exec VP-Der: H B Jordan
Exec VP-Acctg: G W Rooney
Sec: B L Rawlins
Treas: H E Isham
(See Mich, Minn, Mont, Utah & South)

U S STEEL CORPO AMERICAN STEEL & WIRE DIV DONORA, PB DONORA ZINC WORKS (See Central) (See U S Sweel)

U S VANADIUM CO DIV UNION CARBIDE & CARBON GORP

30 East 42nd St. New York 17, N Y Pres: W E Remmers VPs: JH Spillane, O F Holmgren Gen Mgr: H L McKinley Gen Supt, Calif: A C Sada Gen Supt, Colo: A Q Lundquist (See Calif, Colo)

UNIVERSAL ATLAS CEMENT CO 100 Park Ave, New York 17, N Y OPERATIONS, Clarence Center, N Y, gypsum (See Okla)

VANADIUM CORP OF AMER
420 Lexington Ave, New York 17, NY
Press: W C Keeley
VP: Q C Floyd
VP, Mng. D W Viles
VP & Sec: B O Brand
Purch Agt: S W Stewart
Treas: L C Miller
(See Colo, New Mex, Aris & Utah)

VERMONT ASBESTOS MINES DIV (See The Rubberoid Co)

VERMONT COPPER CO, INC
South Strafford, VI
Pres: John F Cowley
VF & Mgr: Clarence B Benson
Sec: Stanley C Wilson
Met: John W Sheedy
Ceol: Dr. Alime K Mikkola
Elec Engr: Joseph T Maclay
Safety Engr: Richard H Little
Purch Agt: Harold I Davis
ELIZABETH MINE, 2 mi SE of
South Strafford, undergod a surface, Cu,
Ag, pyrho tite concen
Mine Supt: Clinton L Miller
Aust Mine Supt: Chae F Banker
Mine Engr: Richard H Little
950-TON FLOT MILL
MINI Supt: John W Sheedy
Mill Foreman: Chaples L Adolph
Assay: Roch Bonnett
ELY, PIKE HILL MINES

VERMONT MINERAL
PRODUCTS, INC
Chester, VI
Pres & Gen Mgr: Stanley F Dorand
Sec: Walter H Austin
READING QUARRY, Reading, Vt, surf,
mitterness tale
Mine Supt: Hollie N Corbin
GRAV MILL
MIII Foreman: I S Wheeler

VERMONT TALC CO 220 E 42nd St, New York, N Y (See Calif, Mont, Central & South)

WARNER COMPANY
Bellefonte, Pa
Pree: John Curtin, Jr
VP: JH Whitten
Gen Supt: Fred Warner
Ch Engr: A C Hewitt
Purch Agi: B C Taylor
BELL MING, Bellefonte, undergd,
Rimsstimme
Prod: 3, 400 tons
Mine Supt: H A Corre

WARREN FOUNDRY &
PIPE CORP
55 Liberty St, New York 5, NY
PO Box 392, Dover, N J
Ch of Bd: Solomon E Shahmoon
VP: Hugh K Bennett
Sec-Trens: Robt Salomon
Gen Supt: Allan James
Purch Agt: Fred Djedds
MT HOPE MINE, Mt Hope, NJ
undergd, nagnettie
Prod: 2,000 tons
Mine Supt: Jack Halen
Aast Mine Supt: John Sheplak
Foremen: Oregg Sad, if Buckingham
Ch Enge: Thomas J Holland
Maint Supt: Chas W Struble
Safety Enge: Randolph Brogan
2,000-TON FLOT MILL
Mill Supt: Henry J Schwellenbach

WHITEHALL CO, INC
17 Battery 11, New York 4, N Y
Pres: Evereley Childs
VP a Gen Mgr: A E Davison
VP: P B Verplapck
Sec-Treas: L G Clark
RUGGLES MINE, Grafton, N H,
surface, feldspar, mica, beryl,
spedumense

NEW MINE OPERATORS			
	DAMES OF	 -	

UNLISTED MINE OPERATORS

Tear	out	and r	nail ti	nis.	form	to rec	elve q	uest	ionnaire	for	listing
		yeur	mine	in	the	"Mine	Direct	ory	Section."		

Editor,	Minin	a War	del.			******	-			,
				isco, California						
Please	send	Mine	Directory	Questionnaire	10	me	at	the	following	oddress

City

HOW TO USE

Pre-Filed Catalog Section
The Buyer's Guide For
Mine-Mill-Smelter Equipment

USE THIS CARD TO WRITE TO THE MANUFACTURER DIRECT

Postage Required

- ▶ Keep the catalog section on your desk for ready reference.
- ➤ To find the manufacturer of a specific product: Look under the product heading in Section 1 of the yellow pages. All principal manufacturers of specialized minemill-smelter equipment are listed.
- Next, refer to the manufacturer's catalog or advertisement for further product description. Advertisers are listed in bold face type.
- For complete information on any product, fill-out the attached postage cards.
- The names and addresses of manufacturers are listed alphabetically in Section II of the yellow pages.

These two cards
are addressed to
Mining World. List the
information you want—
WE'LL DO THE REST.
No postage necessary
if mailed in U. S.

Read the advertisements. They give you the latest information on mining equipment.

GENTLEMEN:

Please send me FREE information on your equipment as advertised and indexed on page in MINING WORLD's 1954 Annual Catalog Issue, Development and Directory Number.

Product:
Product:

Name:

Company:

MINING WORLD-WORLD MINING CATALOG SERVICE

MINING WORLD-WORLD MINING CATALOG SERVICE

MINING WORLD PRODUCT EDITOR:

Please send me FREE information on the equipment advertised and indexed on:

Page: Product: Mfr: Page: Product: Mfr: Mfr: Page: Product: Mfr: Mfr: Page: Product: Mfr: Mfr: Mfr: Mfr: Mfr: Mame: Title: Company: Address:

MINING WORLD-WORLD MINING CATALOG SERVICE

MINING WORLD PRODUCT EDITOR:

Please send me FREE Information on the equipment advertised and indexed on:

 Page:
 Product:
 Mfr:

 ame:
 Title:

 ompany:
 ddress:

THESE CARDS ARE SIMPLE TO USE. THE OTHER SIDE TELLS YOU HOW!

USE THESE CARDS

To get FREE up-to-date information on the newest in mine-mill-smelter equipment

Piace Here

- Section I of the yellow pages is your product Index
- ➤ Section II of the yellow pages lists alphabetically all principal manufacturers of specialized mining equipment and their addresses.
- Keep this catalog section on your want to refer to it often

desk for ready reference. You will

Further information on any product advertised is available. Mail these two cards today. We will forward your request to the manufacturer immediately

> FREE INFORMATION



To:

BUSINESS REPLY CARD

MINING WORLD-WORLD MINING

121 SECOND STREET SAN FRANCISCO S. CALIFORNIA

U. S. A.



BUSINESS REPLY CARD

MINING WORLD-WORLD MINING

121 SECOND STREET SAN FRANCISCO S. CALIFORNIA

U. S. A.



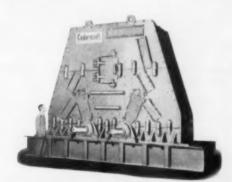
HEAVY-DUTY EQUIPMENT FOR CUTTING PROCESSING COSTS

Cedarapids equipment is engineered with all the features assential to low-cost ore handling. Each unit is built for the extra strength necessary for heavy-duty service in the world's most rugged industry. Each unit is designed by experts in the field for high capacity production. The proved-in-service" low maintenance costs of Cedarapids equipment is another bonus feature that helps you cut provessing costs. Investigate Cedarapids advantages today!

followers and assemble 2 and less than the second

ASSURE SMOOTH, WORKABLE FLOW OF CRE

This big 40° x 12'4½' Apron Feeder is especially designed for smooth feeding of heavy, large-size material. Rugged construction, with 9 shafts beneath the heavy cast steel flights, withstands the dumping of heavy loads into the feeder.



DOUBLE BURRAIT BURRACT BUCACTOR

FOR PRIMARY AND SECONDARY CRUSHING IN ONE OPERATION

Double Impeller Impact Breakers are being used for more and more mining applications because of their exceptionally high output, design which permits a high percentage of material to be broken in suspension to minimize wear and reduce power requirements and the high reduction ratios which eliminate the need for secondary crushers in many instances. It will pay you to investigate all the many other advantages of Double Impeller Impact Breakers.



MEGVORIOUTEV SCALPING SCHOOL

COMBINE BIG-VOLUME PRODUCTION WITH LOW MAINTENANCE COSTS

Cedarapids Inclined Double Deck Vibrating Screens are sturdily built to handle 2 to 3-ft. material. Eccentric shaft vibrating mechanism provides positive circle throw to assure big-volume output. Easily replaceable plate feed box and discharge lip reduce maintenance costs.



MOYOTIZED MIND PULLEYS.

CUT CONVEYOR MAINTENANCE COSTS 70 TO 90%

Everything is contained inside the pulley shell! The complete elimination of chains, sprokets, V-belts, jack shafts, etc. eliminates 70 to 90% of conveyor maintenance costs. More and more mining companies are modernizing their conveyor systems with these revolutionary Motorized Pulleys to cut costs.

See your nearest

Cedarapids Distributor

for complete details

IOWA
MANUFACTURING COMPANY
Codar Rapids, Iowa, U.S.A.

Advanced Application Of Vibratory Principle Reduces Bulk Handling Costs With



Syntron Vibrator insures positive flow of crushed atone from huge storage hopper to conveyor belt.



Two Syntron Feeders control the flow of coal from track hoppers to conveyor belt.



ELECTRIC VIBRATORS

3600 controllable vibrations per minute insure a positive free flow of bulk materials through bins, hoppers and chutes. No arching or plugging. Compact easy to install.

VIBRATORY FEEDERS

Have large tonnage capacity for handling most bulk materials — abrasive, fine or lumpy — hot or cold — dry or damp. Positive control of feeding rate.



SCREENING FEEDERS



VIBRATING GRIZZLIES

High speed — electromagnetic feed and scalp in one operation. Maintain maximum flow of materials on crusher or coarse sizing operations. Non-binding, tapered grizzly bars.



BALANCED CONVEYORS

Compulsory driven, swinging mass type conveyors. Convey and screen simultaneously. Flat or tubular reciprocating troughs.

a-c to d-c POWER CONVERSION UNITS

Complete Packaged Units capable of delivering up to 550 volt d-c for mining machinery, locomotives, cranes, etc. Easy to install, require no warm-up time, no moving parts to be serviced.



SYNTRON

EQUIPMENT

For long, trouble-free operation on the toughest industrial asssignments, Syntron Equipment is ideally suited for automatic or semi-automatic production methods.

Additional cost saving Syntron Equipment includes Batch Weigh Plants, Hopper Level Switches, Flow Control Valves, Shaft Seals, and Gasoline Hammer Rock Drills.

Write For Complete, Illustrated
Catalogue Data - FREE



SYNTRON COMPANY
166 Lexington Avenue Homer City, Penna

[World Mining Section-198]

MINING WORLD

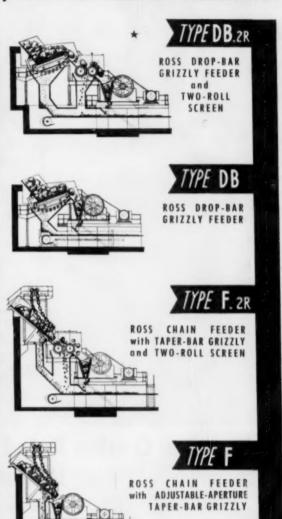
SERVING ALL MAKES, TYPES & SIZES OF CRUSHERS

Quite unrivalled for modern, large scale operations.
Plants supplied for any tonnage from 10 to 2,000 tons per hour.



If the material is clean or fairly clean, any of the four plants * may be used.

If the material is sticky, TYPE D B. 2 R only should be used.



Quotations can be supplied in dollars or sterling

ROSS SCREEN AND FEEDER CO., 100 QUIMBY STREET, WESTFIELD, N. J. Telephone: Westfield 2-8133

ROSS ENGINEERS LTD., 11 WALPOLE ROAD, SURBITON, SURREY, ENGLAND. CANADIAN LICENSEE: E. LONG LTD., ORILLIA, ONTARIO.



Giant New Jaw Crusher Rated to Deliver Over <u>600</u> TPH at 13" Setting

Workmen are dwarfed by the 19,000 lb. pitman and 5200 lb. shaft assembly being lowered into place as PIONEER assembles the world's largest overhead eccentric jaw crusher. This 42" x 48" crusher reduces rocks in a 4 cu. yd. crushing chamber at a calculated capacity of over 600 tph with maximum jaw setting of 13". Minimum setting is 4". Length of moving jaw is 104"; stationary jaw, 90". Crusher was designed to reduce drilling and blasting costs.

Welded steel construction of the base allows crusher to be built with a total weight of less than 95,000 lbs. These features are important in preventing excessive maintenance cost: A patented closure between inner and outer bearings which makes it possible to place bearings

closer together than on any other antifriction bearing jaw crusher . . . thus greatly reducing shaft strain. Outer bearings saddle-mounted in the frame on precision-machined parts. Split-reversible jaw plates, cast from tough, alloyed manganese steel, designed to prevent cold flow and peening. Toggle plate safety device protects crusher when noncrushable material enters chamber.

Want the production reports on how this giant crusher can cut operating costs for cement and lime producers? Write now to

Pioneer ENGINEERING WORKS, INC.

Minneapelis 13, Minnesota

[World Mining Section-200]



Like all PIONEER jaw crushers, the 42" x 48" has an all-welded steel base of double-wall, box-type construction. Design reduces weight, but strength is substantially greater than is possible with a cast steel base of the same dimensions.



Hydraulic process uses oil pressure to expand inner races of shaft bearings. This permits bearings to slide freely from shaft so that bearings to slide freely from shaft so that bearings check-up and maintenance become relatively simple. Shaft is 10' long, 14½".



Ready to go. Giant crusher is ready for shipment to the U. S. Lime Products Corp., Las Vegas, Nevada. Two-unit base permits easy har.dling by standard equipment.

KENNEDY

CRUSHING MACHINERY and EQUIPMENT, COMPLETE MINING PLANTS

... in use the world over!



KVS machinery and equipment is designed, engineered and built to serve the mining industry. Scientific, physical aids that combine utmost utility with rugged stamina . . . the kind of machinery that produces peak capacities with a minimum of maintenance.



SWING JAW CRUSHER—Heavy duty; reversible swing jaws.



An outstanding characteristic of KVS equipment is the fact that all parts are standardized . . . replacements can be made by any qualified machinist . . . spare parts FIT, because they are machined to exacting tolerances . . . ready for instant use. When the rare occasion arises where replacements are necessary, air express deliveries bring you the part needed anywhere in the world and the machine is back in operation within a matter of hours!



SLUGGER ROLL-Reduction variable from 2" to 10" while operating.



Enthusiastic users tell us that KVS machinery is breaking all records for producing maximum rock tonnage at minimum operating cost. Our engineers are available at any time for consultation on *your* crushing and handling problems. Write, cable or phone.



TUBE MILL-Drives KVS mills of any diameter, length.



Send for illustrated bulletins describing all KVS products.



AIR SWEPT TUBE MILL-Produces 94% plus through 325 mesh when grind-ing -2" clinker.



KENNEDY - VAN SAUN

MANUFACTURING & ENGINEERING CORPORATION
TWO PARK AVENUE, NEW YORK
FACTORY DANVILLE, PA.



STEPHENS-ADAMSON MFG. CO.

13 Ridgeway Avenue AURORA, ILLINOIS

Belleville, Ont.



-ENGINEERING SALES OFFICES-

ATLANTA, GA., Box 268 Station A AURORA, ILL., Main Office and Factory BOSTON 16, MASS., Park Square Bidg. CHICAGO 6, ILL., 20 N. Wacker Drive CLEVELAND 15, OHIO, 472 Hanna Bidg. DETROIT 26, MICH, 819 Book Bidg. LOS ANGELES 38, CAL., 2227 E. 37th \$1., Factory

Factory NEW YORK 7, N. Y., 50 Church St. PITTSBURGH 22, PA., 1408-9 Investment Bldg. PORTLAND 14, ORE., 1007 E. Burnside St. ST. LOUIS 1, MO., 1414 Paul Brown Bldg. SAN FRANCISCO 5, CAL., 151 Mission St. SEATTLE 1, WASH., 1402 Third Ave. BELLEVILLE, ONT., Canadian Factory MONTREAL, QUEBEC, Canada Cement Bldg. TORONTO 1, ONT., Montreal Trust Bldg. VANCOUVER, B.C., 716 Cambie St. MANILA, P.I. and ORIENT, Atkins Kroll & Co.

MEXICO CITY, D.F., Compania Importadota, Y Exportadora, S.A. Lago Iseo 42
JOHANNESBURG, SO. AFRICA, Fraser & Chalmers S.A. Ltd.
CARACAS, VENEZUELA, Gieason & Compania, S.A.
BRUSSELS, BELGIUM, Etudes et Recherches Industrielles, S.A.
PONCE, PUERTO RICO, Porto Rico Iron Works. Inc.

AMSCO PAN FEEDERS

Los Angeles, Cal.



Stephens-Adamson AMSCO Pan Feeders are built to operate under the most severe conditions. They withstand crushing impact, repeated shocks and abrasive loads—handling enormous tonnages of ore dumped upon them with minimum maintenance year after year . . All wearing parts of the feeder, such as pans, chain, track rollers, sprockets and tail idlers are cast of manganese steel. This is the toughest steel known—and actually grows tougher with use. Manganese steel, plus the patented design of the feeder, combine to produce a unit of extreme strength with a minimum of weight. AMSCO Pan Feeders are individually engineered in sizes from 22" to 102" in pan width, with centers up to 100 feet and capacities to 2000 tons per hour. The AMSCO will operate up inclines to 16 degrees. Integral side flanges on the pans prevent leakage or spillage of material. For more complete information on these and other types of feeders, write for S-A Feeder Bulletin 154.

S-A NATURAL FREQUENCY CONVEYOR



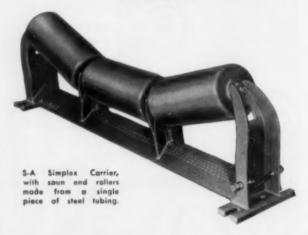
Power regenerated by coil springs is utilized to convey bulk materials at low cost. Conveyor is made in 10-foot sections . . . one drive serves several sections. Balance frame eliminates need for heavy, rigid supports. Conveyor features quiet operation, low headroom and low power and maintenance costs. Write for Bulletin 353.

S-A SPRING-TYPE CONVEYOR BELT CLEANER



Prolongs belt life by removing wet or dry materials from belts before they can be ground in. Multiple blades in adjustable-pressure spring assembly are reversible and quickly replaceable. No moving parts, no power required. Easily installed and adjustable to fit any size conveyor. Write for Bulletin 651.

S-A CARRIERS



S-A manufactures belt conveying systems of all types and a complete line of carriers for all operating conditions. Shown here is the S-A Simplex Carrier, designed for rugged jobs and exposure to dust and weather through years of service. Each roller is spun from a single piece of steel tubing. Roller bearings in seamless steel tube hubs are protected by die cast labyrinth seals. The all steel frame is flanged, reinforced and accurately jig welded for great strength and elimination of unnecessary weight. Improved lubrication is provided each roller from one or both sides of the carrier. Available with 5" or 6" rollers for conveyor belts from 18" to 60" wide. Close spacing of rollers provides maximum belt support, with belt automatically centered without need for side guide rollers. Write for Bulletin 2-C.

S-A ROLLER TYPE HOLD BACKS





Prevents reversal of loaded conveyors or bucket elevators when power is interrupted. Mounts on conveyor head shaft extension. The instant headshaft stops rotating, the Hold Back roller engages the wide-faced drum with a gentle, positive grip. No ratchets, no roll-back or shock. Releases automatically when power is applied. Eleven sizes for maximum torque of 6,000 to 500,000 lbs. Write for Bulletin 651.

Moderate cost...light on labor little maintenance...BUT



SAUERMAN EQUIPMENT

Check digging power . . . rate of haul . . . clean dumping. Add labor economy . . . low upkeep . . . personnel safety . . . moderate power consumption. Total up the score . . . you'll choose one of these Sauerman Machines for your operation.

DRAG SCRAPER: best for pit or hill excavation, reclamation or general handling of materials, wet or dry. Serves as rapid, long range conveyor. Sizes ½ to 15 cu. yds.

SLACKLINE CABLEWAY: best for deep digging—especially underwater—and conveying to a high delivery point. Reaches down a hundred feet or more...spans up to 1000 ft....sizes ½ to 3½ cu. yds.

DRAG SCRAPER STOCKPILER: best for profitable handling of sand and gravel, ores and chemicals. Low on first cost, plus economical one-man operation.

CRESCENT SCRAPER ON BOOM MA-CHINE: best for increasing the work capacity of any boom machine on backfilling and grading jobs. When scraper is used with track cable and trolley, machine range is greatly extended.

Call on Sauerman's experienced engineers for the size and type system best suited to your digging, hauling or materials handling requirements. Write for catalogs

requirements. Write for catalogs
. . . ask for ideapacked Sauerman
News.



Stackline cableway performs difficult exeavation of non-caving material from deep plt. 70% rock and 30% colloidal sand poind tough digging job. Ask for Catalog C and Field Report 21%



claim different sizes of crushed stone from adjoining piles to belt conveyors delivering to a common hopper used to load cars with straight or mixed sizes. Ask for Catalog E.



ONE MAN

SAUERMAN BROS., INC.

538 S. Clinton St., Chicago 7, III.
CATALOG, DEVELOPMENT AND DIRECTORY NUMBER, 1954

Typical

Saverman

Installations



2 cu. yd. Sauerman Scraper reclaims 90 tph. from zinc mine chat pile.



Tri-State Zinc Mine uses Saverman Slackline Cableway for open pit mining.

Engineering Service

An analysis of your problem and estimate of cost will be given by our engineering department without obligation to you.

When requesting information, please give pertinent data which may effect design, such as general type of work, nature and weight of material, location and method of delivery. A rough sketch showing shape and dimensions of area to be covered should be included. For storage installations it is necessary to know total storage requirements, annual turnover and handling capacities (stocking out and reclaiming) required per hour.

RIBLET AERIAL TRAMWAY CO.

N. 1231 WASHINGTON ST.

SPOKANE, WASH., U.S.A.

Designers, Manufacturers, Erectors of Riblet-Hanson Ropeways



Breakover Tower, 110 feet in height crossing glaciers in Alaska

Single Truck—Single Grip Carrier For fifty-five (55) years the Ribiet Tramway Company has been serving the mining industry in a world-wide capacity providing rapid, dependable and economical transportation.

Riblet-Hansen Ropeways are notable for their smoothness of operation, dependability, low operating and maintenance costs and their relatively low first cost made possible by unique methods of construction.

Riblet-Hansen Ropeways are designed to transport capacities ranging from 5 tons to 300 tons per hour. We have installed systems ranging from a few hundred feet to thirty-five miles in length, having spans up to a mile in length and crossing summits over 16,000 feet in elevation.

Each installation is an individual engineering problem as no two profiles are ever alike and loading and discharge conditions seldom the same. Our years of experience with hundreds of installations qualify us to solve your transportation problems.



Typical Tower

TYPES OF RIBLET-HANSEN ROPEWAYS

1. Continuous Bi-Cabie Systems

In these systems the carriers run upon stationary track cables, their motion being controlled by a moving traction rope. The carriers move in a continuous circuit, passing around end curves in the terminals.

2. Automatic Return Systems

These are similar to continuous systems, except that the carriers do not detach at the Discharge Terminal.

3. Step-To-Load Systems

These are continuous systems of intermediate length and capacity. These systems are stopped when the buckets are loaded as the carriers are permanently clipped to the traction rope.

4. Jig-Back or Reversible Systems

In these systems, two carriers move in a reciprocating motion between the Loading and Discharge Terminals, each carrier running upon its own track cable.



Double Truck—Double Grip Carrier

ROLLING STOCK

Riblet Carriers are built in a number of diverse forms to suit different capacities and different classes of material.

For general purposes the Double-Grip, Double-Truck Carrier is recommended. With this Carrier the life of the cables is greatly prolonged because of the additional sheaves; also the two grips greatly increase safety and prevent interruption of service.

For smaller capacities Single-Truck, Single-Grip Carriers are usually furnished.

The most vital part of an aerial tramway system is the Carrier

Grip. The Riblet Grip is noteworthy for its simplicity, its dependability, its powerful and positive gripping action and for its small number of moving parts.

The Trolley Sheaves are usually made from alloy steel but they are also made in a number of other designs to suit special conditions. All are furnished with Timken Tapered Roller Bearings.

The tubs are made in various forms to suit the material to be transported. For general purposes, tubs of the revolving type are used and for heavier capacities bottom and end dump types are employed.



Over the Andrs in Bolivia



Typical Discharge Terminal

Send for information sheets and we will make you a preliminary estimate.

The Proven Recovery Method With A New and Different Approach

The Stephan CONCENTRATOR will:

Recover minerals not amenable to other processes

Utilize less space for large capacity installation

Upgrade concentrates or middling products

Reduce troublesome middling circuits

Reduce water and power consumption

Eliminate need for sized feeds

Absorb irregularities of feed

Simplify your operation

Reduce maintenance

MODEL C-3
CONCENTRATOR
FOR MILLED
ORES OR PLACERS

A Large Range of Models and Sizes

Stephan Concentrators will recover minerals with a specific gravity of 4 or over, such as; Tungsten ores, monazite, gold, cassiterite, platinum, cinnabar and various sulphides and oxidized ores.

These units are of rugged, all metal or metal and rubber construction. Special features include patented, high speed motion and functional sur-

face. A continuing research program is developing an ever increasing range of application.

Placer Units handle large capacities, make recoveries of extremely fine, flaky and coated values, eliminate packing. Highly effective treatment of black sands and placer concentrates.

Prospector Unit - Model P-1

Also available with trommel for screening and with wider hopper, Interchangeable "concentrator" or "placer" decks. Ideal for testing, cleanup, or small operation. Demountable wheels and handles optional for "oneman" portability.

Request Bulletin GP-7

THE STEPHAN CORPORATION

2022 Broadway, Sacramento, California
CATALOG, DEVELOPMENT AND DIRECTORY NUMBER, 1954



MORRIS MACHINE WORKS

BALDWINSVILLE, N. Y.

Builders of Centrifugal Pumps and Hydraulic Dredges Since 1864

Atlanta, Ga. Baltimore, Md. Boston, Mass. Buffalo, N. Y. Charlotte, N. C. Chicago, III. Cincinnati, O. Cleveland, O. Denver, Colo. Detroit, Mich. Houston, Texas Johnstown, Pa.

Kansos City, Mo. Los Angeles, Calif. Mulberry, Fla. New Orleans, La. New York, N. Y. Omaha, Neb.

Philadelphia, Pa. Pittsburgh, Pa. Portland, Ore. Richmond, Va. St. Paul, Minn. Salt Lake City, Utah San Francisco, Calif. Scranton, Pa. Seattle, Wash. Syracuse, N. Y. Troy, N. Y.

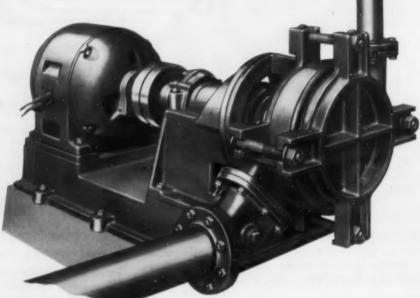
Canada: Storey Pump & Equipment Co., Toronto; F. H. Hopkins & Co., Montreal; A. B. Wing, Vancouver, B. C. Export Office: 50 Church St., New York 7, N. V.



Type "R" SLURRY PUMP

For Handling

- Ore Slurries
- Tailings
- Concentrates
- Any Abrasive Mixture



Ideal For Flotation Mill Service

Morris Type "R" Slurry Pump is specifically engineered to handle ore concentrates . . . tailings, slag and residue from filters and classifiers . . . all types of caustic or acid mixtures containing abrasives or solids.

When used in flotation systems, Morris Type "R" practically eliminates clogged suction lines. That's because this pump is capable of operating under suction lift. Positive head is not required. This design feature lets atmospheric pressure do its work-and in many instances it's sufficient to clear the stoppage, Shutdowns and dismantling of pipe lines are greatly re-

Trouble-Free, Long-Service Features

- Extra-heavy construction for severe continuous duty.
 Low speed and low velocities through impeller and casing. resulting in less wear.

- Deep stuffing box under suction pressure only, minimizes entrance of grit into the stuffing box.
- Pump requires only nominal sealing water pressure.
- · Slurry dilution negligible.
- · Remove only four bolts to dismantle.
- Renew impellers and liners without disturbing piping.
- Suction and discharge nozzles can be swiveled in many different positions merely by rotating the parts.
- · All parts except impeller and shaft interchangeable for clockwise or anti-clockwise rotation.
- Each wearing part interchangeable in a considerable number of alloys and materials depending upon the operating condi-

Type "R" can be used to advantage in both metallic and non-metallic mines and mills. As a new installation or as a replacement, this pump will fit easily into your existing plant. Sizes: 2" to 8". Write for Bulletin No. 181.



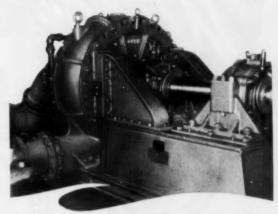
ORRIS) Type "G" DREDGE PUMP

For Pumping Metallic and Non-Metallic Materials in Open Pit Mining

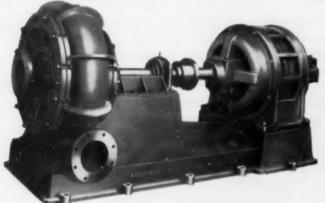
A New Opportunity to Save. The modern way to transport pre-crushed coal from strip mines to breakers is to pump it. This superior method has great cost advantages over trucking—it eliminates expensive truck maintenance . . . trucking labor . . . often, the

building of truck roads.

Morris Type "G" Dredging Pumps provide the lowest possible overall cost per yard or ton. Their specially designed bearings stand up under all loads, hydraulic or mechanical, encountered in severest types of dredging work. Impellers are pressure-balanced to wear evenly and last longer. Other proved Morris features include volute-type casing—interchangeable liners on hub and suction sides—easily accessible stuffing box—vibration-free, extra-large, high-grade steel shaft.



Sizes: 6" to 36". Larger sizes will pump materials through 2 miles of pipe line . . . operate under total heads up to 300 ft. Write for detailed literature.





Type "M" Material Handling Pump

The Standard Pump in Many Mines for Coal Cleaning. This service is particularly severe because of the abrasive sand and corrosive sulphuric acid which are handled. Morris Type "M" pumps can be furnished with wearing parts

"M" pumps can be furnished with wearing parts of special flint alloys to resist both abrasive and corrosive action, have double heavy-duty, dust-proof ball bearings, and are properly designed for minimizing hydraulic and mechanical losses, for eliminating vibration and packing troubles, and for assuring correct hydraulic balance. Solid-lined pumps can also be furnished with horizontally-split casing for accessibility to replace lining.

These pumps are built in a range of designs for moderate and severe services, in sizes up to 15 in., for motor or belt drive, and will handle solids up to 11 in. diameter. Send for Bulletin No. 175.



Double-Suction Horizontally-Split Centrifugal Pump

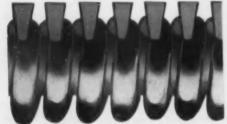
For Drainage and General Service

Lasting Reliability with Low Upkeep. These pumps have bronze impellers and shaft wearing sleeves, waterproof and dust-proof ring oiling or ball bearings, special provisions for complete rigidity and hydraulic balance, and exceptionally high efficiency. The entire pump can be furnished of acid-resisting bronze or special metal when required by the liquid to be handled. Described in Bulletin No. 179.

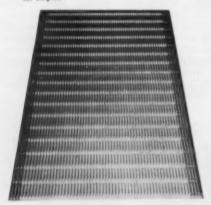


Medge-Wire REG. U. S. PAT. OFF. REG. U. S. PAT. OFF.

The diagram above illustrates clearly and concisely the non-clogging and non-blinding advantages of Wedge-Wire preparation screens. All materials "clear" quickly, thus increasing efficiency in production.



The wedge shaped wires permit KLEENSLOT screens to clear rapidly and increase material autaut.



PREPARATION, SIZING and DEWATERING SCREENS for THE MINING FIELD

DESIGNED and PRODUCED TO YOUR SPECIFICATIONS

Wedge-Wire KLEENSLOT preparation screens were developed to provide high production at lowest cost per ton. We offer to the mining industry which has screening, dewatering, washing, drying, filtering or sizing problems, a high standard of efficiency and performance. In short, we offer efficient precision applications, coupled with long life. Greater design strength is obtained in even the smallest size by rigid cross-rods which tie the wires together, eliminating distortions of openings and giving maximum strength and support.

Only quality materials are used, including mild steel, stainless steel, bronze, brass, monel, copper, nickel, aluminum and silicon bronze.

All Wedge-Wire screens are manufactured to your specifications and be assured that our engineering staff will capably assist you promptly in obtaining the proper and correct solution to your preparation problems.

KLEENSLOT screens are made to fit any type of machine or installation. They may be curved to any shape or form, drums, troughs, etc.

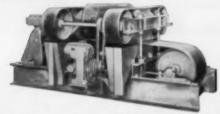
Wedge-Wire

Vire CORPORATION
GAS ST. at NICKEL PLATE R.R. - WELLINGTON, OHIO

MAGNETIC EQUIPMENT

tailored to the Mining Industry

CROSS-BELT SEPARATOR

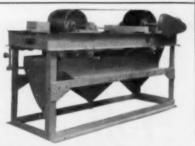


Equipped with exclusive, patented variable pitch lower pole, the Stearns Type R cross-belt separator provides amazing control in separating weakly magnetic ores in both placer and hard rock deposits magnetite, wolframite, heubnerite, feberite, columbite, tantalite and ilmenite.

With variable lower pole, you can obtain as many as one non-magnetic and ten magnetic products from two magnets. Ordinary units require five magnets and double the cost.

MWI HEAVY-MEDIA MAGNETIC

SEPARATOR



Developed specifically for the recovery of magnetic media in the heavy-media process, the Stearns MWI separator requires a minimum of adjustments . . . efficiently maintains recoveries as high as 99.9 percent under varying load and capacity conditions . . . provides efficient magnetite or ferrosilicon media recovery in plants handling ores such as iron, fluorspar, coal, zinc, lead, etc. Bulletin 82

STEARNS Magnetic, Inc., builds a complete line of magnetic separation equipment to meet the specific requirements of both metallic and non-metallic mining operations. Equipment includes electro-magnetic pulleys, heavy media separators, cross-belt separators and suspended separation magnets.

Stearns' experienced engineers work directly with you in designing and installing magnetic equipment that is engineered to fit your individual operating needs exactly.

In addition, the company maintains a fully-equipped laboratory for thoroughly analyzing and testing ore samples. Requests for analysis or information receive immediate attention. We welcome your inquiry.

ELECTRIC-MAGNETIC PULLEY



Powerful Stearns electro-magnetic pulley effectively removes tramp iron from fast-flowing, heavily-loaded conveyor lines. Solidly built, thoroughly insulated and protected. Special, new thin-coat drum lagging increases tractive effort without affecting magnetic pull. Sizes range from 12-inch diameter units to world's largest. Bulletin 303-B



SUSPENDED SEPARATION MAGNET

Provides a tremendous pulling force that reaches far down into material on conveyor lines - prevents escape of deeply embedded tramp iron. Coil-wound for continuous duty. Special insulation and rib-type head casting assures fast heat dissipation. 16-inch to 65-inch diameter size range. Round or rectangular construction. Bulletin 25D

MAGNETIC EQUIPMENT FOR ALL INDUSTRY

STEARNS MAGNETIC, INC.



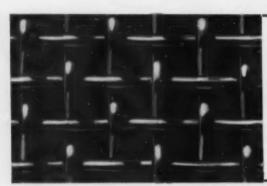
685 S. 28th St., Milwaukee 46, Wis.

STEEL PRODUCTS for



WICKWIRE ROPE

Over 125 years of experience in the manufacture of wire and wire products stands behind Wickwire Rope. It is made from wire with the maximum degree of hardness, strength, toughness and fatigue resistance. Quality controls, through the manufacturing process, assure the utmost in performance, safety and long life.



CAL-WIC INDUSTRIAL SCREENS



For every screening operation there is a Cal-Wic Screen that will give maximum output of the desired product with minimum wear. They are woven to the most exacting tolerances for the greatest efficiency.



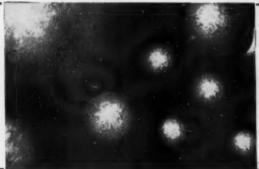
CF&I ROCK BOLTS



This modern means of mine roof or wall support provides greater safety, economy and better housekeeping. Slot and wedge type, as illustrated, or expansion shell type.

From ore to finished product... CF&I mining specialties are products of a completely integrated operation. They are manufactured to the high standards of quality recognized by the mining industry.

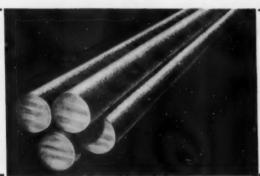
MINING'S GREATEST ERA





CF&I GRINDING BALLS

CF&I Grinding Balls are forged from special analysis steel to give high impact and abrasion resistance... the balance between toughness and hardness insures greater through-put, even wear and high efficiency.





CF&I GRINDING RODS

Rolled from special analysis steel for efficient, economical grinding. Machine straightened with square cut ends. Equally effective for Fine Crushing or Coarse Grinding.



CF&I MINE RAILS & ACCESSORIES



Made to A.R.A. standards; available in a range from 12 to 45 pounds. Accessories include splice bars, angle bars, spikes, track bolts and nuts—square or hexagon.

THE COLORADO FUEL AND IRON CORPORATION * Deaver, Celerado
WICKWIRE SPENCER STEEL DIVISION * New York, New York PACIFIC COAST DIVISION * Oakland, California

THE COLORADO FUEL AND IRON CORPORATION

(Fd

CATALOG, DEVELOPMENT AND DIRECTORY NUMBER, 1954



MERRICK SCALE MFG. COMPANY

179 Summer Street, Passaic, New Jersey

Specialists in Automatic Weighing Equipment

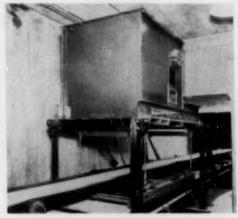
The products of Merrick Scale Mfg. Company, although essentially weighing devices, are designed to function in a much broader capacity in many difficult con-

trolling operations peculiar to the Process Industries. We have had over 40 years' experience in building equipment to solve such production problems as the weighing of materials in transit, automatic proportioning and batching of materials, weighing of liquids, and accurate totalizing and recording of continuously conveyed material without interruption of process.

The Weightometer, Feedoweight, and other Merrick weighing devices are carefully engineered for many other useful applications throughout the Industry than can be described on these pages. For complete data on these important items of production equipment, briefly outline your problem and mail it to the above address. Full information and covering literature will be sent to you without obligation.

The Merrick WEIGHTOMETER is a self contained integrating and totalizing conveyor scale for use with an existing belt conveyor of any width and capacity. It combines the principles of a platform scale and mechanical integrator. By utilizing a portion of the Conveyor Belt as the Weighing Platform and mechanically multiplying the weight on the belt by the belt speed through a mechanical integrator, a totalized weight is automatically obtainable in tons, pounds, barrels or other unit of measure per hour on a Master Totalizing Counter.

Any material that can be conveyor handled can be accurately weighed by a Weightometer. Such materials as coal, ore, sand, gravel, fish, fish products, minerals of all kinds, cement, fertilizer, filter cake, wood chips, sludge, etc., are common to the Weightometer. Weighing is accomplished without expense or interruption to conveyor flow. Neither are the services of a Weighman required. Easily installed, simple in operation, durable, automatic and accurate. All working parts are enclosed.



WEIGHTOMETER*

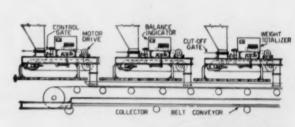
The FEEDOWEIGHT is a dual-purpose machine which correctly and uniformly feeds material by weight and, in addition, automatically totalizes the weight of

The FEEDOWEIGHT delivers accurate amounts of material according to a predetermined setting, the con-trol being accomplished by means of an automatic gate regulated by a special Powered Feed Regulator rather than by direct connection to scale beam. The scale beam is left free to respond instantaneously to any and

all changes of load as it is completely independent of

FEEDOWEIGHT*

The WSS WEIGHTOMETER is offered for use where a The WSS WEIGHTOMETER is offered for use where a conventional belt conveyor is not available for installation of a standard WEIGHTOMETER. The WSS is supplied complete with its own short belt conveyor, carefully and rigidly constructed to provide good weighing conditions; with motor drive and short supports for easy installation at customer's plant. Usually built with flat belt with moulded flanges along both edges with continuous skirts to prevent side spill of material off the belt during travel and weighing.



empty, all units in the battery automatically shut down.



WSS WEIGHTOMETER

The drawing above illustrates an application of three FEEDOWEIGHT units used in a battery arrangement for a proportioning operation. Each unit accurately weighs its own material, automatically controls the rate of feed, and continuously totalizes its weight. Should any hopper become

* Reg. U.S. Pat. Off.

all materials so fed.

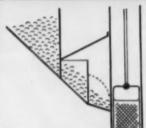
the proportioning mechanism.

Are You Seeking LOWERED COSTS in production or processing?

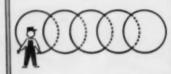
B basic steps are typical of Stearns-Roger's handling of the problem

AUTOMATIC HOIST LOADING.

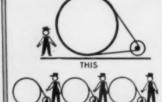
2 INTERLOCKING EQUIPMENT CONTROLS. 3 MORE CAPACITY PER UNIT.



Controlled by a simple system of gates, actuated by descending and ascending skip and timed for full loads without time lag.



Purpose is to permit one operator instead of several for an entire battery of machines—without risk of a "pile up" if one unit goes out for any reason.



INSTEAD OF THIS

Permits higher output per operator, greater h.p. efficiency, less maintenance per ton of product.

While such techniques are not new, their application to any given set of requirements—to obtain closely co-ordinated flow, without "bottle necks" or excess capacity at any one point—calls for know how of the highest order. Stearns-Roger has a fund of experience in LOWERING COSTS in many industries. Draw on that fund—whether you need an entire new plant or additions and modifications of existing facilities.



Stearns-Roger
THE STEARNS-ROGER MEG. CO PRIVER COLORADO

Spend less time changing bits more time drilling

TIMKEN® ROCK BITS ARE INTERCHANGEABLE

No need to waste valuable drilling time switching steels. With Timken® interchangeable rock bits, you can switch quickly from one bit type to the other -right on the job. Dozens of different Timken multi-use and carbide insert bits screw right on the same threaded drill steel!

Because both Timken multi-use and carbide insert bits fit the same steel, there's no need to stock expensive double inventories of drill steels. In addition, both Timken bit types give these other two advantages: 1) made from electric furnace Timken fine alloy steel, 2) special shoulder union keeps drilling impact from damaging threads.

If you have a drilling problem, be sure to call upon our rock bit engineers. They're backed by over 20 years' experience in selecting the most economical bits for every drilling need. There's no obligation. Write The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO."



WHERE YOU CUT COSTS WITH TIMKEN MULTI-USE BITS

Most economical for ordinary ground. With correct and controlled reconditioning, they give lowest cost per foot of hole when full increments of steel can be drilled.



WHERE YOU CUT COSTS WITH TIMKEN CARBIDE INSERT BITS

Give highest speed through hard, abrasive ground. Also most economical for constant-gage holes, smalldiameter holes, very deep holes.



your best bet for the best bit ... for every job





GOODALL RUBBER COMPANY

GENERAL OFFICES, MILLS and EXPORT DIVISION: 430 WHITEHEAD ROAD, TRENTON 4, N. J.

BRANCHES: PHILADELPHIA • NEW YORK • BOSTON • PITTSBURGH • INDIANAPOLIS • CHICAGO • DETROIT ST. PAUL • LOS ANGELES • SAN FRANCISCO • SEATTLE • SPOKANE • PORTLAND • SALT LAKE CITY • DENVER HOUSTON

Goodall Rubber Company of Canada, Ltd., Toronto

Distributors in Other Principal Cities.



"MINE KING"

Sizes 1/2" to 1", I.D.

A Goodall "Standard of Quality" product, designed especially for mining service. Molded and braided construction, with extra strong duck careass, oilproof tube and tough, wear-resistant cover that protects careass from penetration of sulphurous mine water. Extremely flexible. Made in double and triple cord, in continuous lengths up to 500 feet.



"BROWN CORD"

Sizes 1/3" to 1", I.D.

A molded-and-braided hose for drilling, riveting, and other general pneumatic tool service. Tube, carcass and cover are combined to assure great strength and durability, without impairing flexibility and easy handling. Oilproof tube; rubber cover. Available in lengths up to 500 feet.



"SUBWAY" ®

Sizes 1/3" to 11/4", I.D.

Another Goodall "Standard of Quality" hose especially built for rock drilling and all other heavy-duty air tool work. Light weight, flexible, easy to handle. Tough, oilproof black rubber tube; highest quality wrapped duck carcass; wear- and weather-resistant red rubber cover. Maximum lengths of 50 feet.



"NEWTYPE" SUCTION AND DISCHARGE

Patented wire-reinforced, woven cord construction gives "Newtype" unusual strength and durability for both suction and discharge. Light weight, extremely flexible. Cannot kink, buckle or collapse, yet if accidentally crushed, can be quickly rounded into shape again without harm. Smooth bore, in sizes 1" to 4", I.D., and maximum lengths of 50 feet.



OTHER GOODALL SUCTION HOSE . . .

"CORSICAN" Brand. For heavy-duty pump suction service. Rough or smooth bore, in sizes to most all requirements. Maximum langths of 30 feet.

"SPARTAN" Sand Suction Hose. Smooth bore only, with special chrosiveresistant linor. Exceptionally strong, durable, flexible. All standard sizes.



"INFERNO" ®

Sixes 1/3" to 21/2", I.D.

Built with multiple layers of wire braid, heat-resistant tube and tough, abrasive-resistant red rubber cover. Wire braids will cause steam to be diffused from damaged hose, providing a safety factor against sudden burst. Extremely flexible. Recommended for pressures up to 200 lbs., and temperatures up to 400°F. Maximum lengths of 50 feet.



"76"

Sizes 1/2" to 21/2", I.D.

Combines all the quality characteristics required for long, safe performance under conditions involving pressures over 100 lbs., but not exceeding 150 lbs. Wrapped duck construction, with high-temperature tube and black wear-resistant cover. Maximum lengths of 50 feet.



"BUCKSKIN"
WATER HOSE

Sizes 1/2" to 4", I.D.

Long famous for quality and reliability in every water hose service. Tube is of slow-aging rubber stock—tough and pliable. Strong rubber cover withstands roughest surface wear and abuse, and affords maximum protection to cotton duck carcass from contact with moisture. Maximum lengths of 50 feet.



"KEMITE" DUCT WITH "FLANG-LOK" Floating Flanges

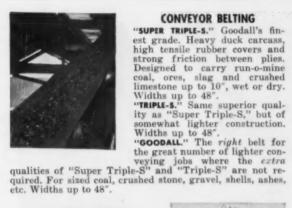
For mine suction and discharge. Tube offers highest resistance to abrasive wear. Wire-reinforced carcass will not kink or collapse. Cover is tough, long-wearing rubber compound. Generally furnished with "Flang-Lok" Ends, to accommodate "Flang-Lok" Flanges. Sizes up to 4", I.D.

"FLANG-LOK" FLANGES provide the most convenient and efficient method of connecting "Kemite" Duct, effecting a leakproof, rubber-to-rubber seal, and permitting full flow. For bolt alignment, flanges turn independently of the duct or pipe. No gaskets or washers. All sizes.

"GOODITE" FLEXIBLE PIPE. Same construction and advantages as "Kemite" Duct, above, but available in larger sizes—up to 12", I.D.

The GOODALL Trademark on hose, belting, boots and clothing for the Mining Industry represents a standard of quality and reliability established through eighty-three years of manufacturing experience, backed by continuing research and development. Product specifications are based on first-hand knowledge of mine service requirements, with selected materials, expert craftsmanship and careful inspection assuring the utmost in on-the-job performance and economy.





CONVEYOR BELTING

"SUPER TRIPLE-S." Goodall's finest grade. Heavy duck carcass high tensile rubber covers and strong friction between plies.

ELEVATOR BELTING

"SUPER TRIPLE-S," "TRI-PLE-S" and "LA CROSSE" are long-established Goodall brands, built to specifications that assure reliable, economical service under conditions for which each is designed. "La Crosse" made in widths up to 30", others to 48". Available with extra features punching, stitching, endless-if





"POWER KING" - Friction surface, raw edge construction, especially built for most severe service. Minimum stretch and firm contact with pulleys at high speeds. Highest quality skim friction between plies. 35 oz. silver duck.

FLAT **TRANSMISSION** BELTING



"LA CROSSE"-Folded edge: 32-oz. duck.

"OSAGE"-Folded edge; 28oz. duck.



PUMP DIAPHRAGMS PUMP VALVES PISTON PACKING ASSESTOS PACKING SYNPLASTIC PACKING RUBBER SHEET PACKING BURBER & DUCK PACKING CHUTE LINING HOSE COUPLINGS, CLAMPS SAFETY HATS

GOODALL WATERPROOF FOOTWEAR and CLOTHING

Famous for Quality, Comfort and Long Wear

"TOE-SAVER" ® BOOTS

Smooth, tough, flexible jet black rubber, heavy duck lined. Cushion insole. White cap reinforced steel toe tested to withstand 2,000 lbs. pressure. Tire-tread soles. Hip, Style MB346. Storm King, Style MB780. Short, Style MB946.

"WEAR KING" ® BOOTS—Identical in quality with above, but without "Tee-Saver." Hip. Style MB345. Sterm King, Style MB799. Short, Style MB945.

"RUBBERHIDE" SAFETY INNERSOLES. Sheet of high-tensile spring steel bonded between layer of top grade sole leather and layer of rubberized canvas duck. Puncture-proof.



MINER'S PACS High quality black minter 3 FAC3 High quality black rubber lace pacs, in three styles: ML-975, 16" high; ML-760, 15" high; ML-179, 10" high. Cushion insole. "Toe-Saver" Safety Toe. Also non-lace "Terra Haute" pacs, Style ML-271, in otherwise same construction. Other boots, workshoes, arctics and rubbers, built for extra wear and comfort

COATS, JACKETS, OVERALLS

Items too numerous to describe here, in rubber, oiled and latex . . . all designed to afford maximum protection plus comfort in every kind of work. Style 338 coat is a long-time favorite . . . double back; cordusoy-lined collar; length 49".

SAFETY HATS

"Hardboiled" Safety Hats in fibre glass and aluminum. Easiest to wear, yet providing maximum protection. Also, miners' caps, with or without lamp brackets.



TUNNEL SUITS

Style 80 Jacket with Style 81 Overall makes the ideal suit for underground work. Other suit combinations to meet every preference or need.

Write for catalog describing the complete Goodall clothing and footwear line.



REPUBLIC RUBBER DIVISION

LEE RUBBER & TIRE CORPORATION YOUNGSTOWN 1. OHIO

INDUSTRIAL RUBBER PRODUCTS

Industrial Rubber Products for Every Type of Service

Specify Republic Rubber Mining Products and you'll save time and money. Every product, designed for a special set of working conditions, is performance pretested before application to the job. This means that, with Republic Rubber Products, you don't gamble against costly breakdowns . . success is predetermined!

Remember, there's a Republic Product for every type of service, and your local Republic Distributor will be happy to make a complete analysis of your exact requirements. Write direct for full facts.



AIR HOSE

CHAMPION—Super service high (300 #) pressure hose with yellow safety cover. 50-ft. lengths, all standard sizes available for toughest duty above or below ground.

REPUBLIC—Heavy duty wrapped hose for general service with pressures up to 250#. % to 2-inch sizes available in 50-ft. lengths.

TOWER—With oil-resistant tube only, or with oil-resistant tube, body and cover for working pressures up to 350±. Sizes up to and including 1-inch supplied in continuous lengths up to 500 ft., 1½ to 1½-inch sizes in continuous lengths up to 300 ft. and 2-inch hose in standard lengths up to 50 ft.







SUCTION HOSE

There's a complete Republic line of suction-discharge hose. Hard Rubber type, rough or smooth bore type, with helix or flat or round wire reinforcement, or interwoven wire type. Sizes range from 1 to 10 inches, and all standard lengths up to and including 50 ft. are available with or without fittings



WATER HOSE

CHAMPION—Premium quality, abrasion-resisting wrapped hose for pressures up to 300 #. Supplied with tan colored cover in V_2 to 2-inch sizes in standard 50-ft. lengths. Integral, tapered soft rubber nozzle may be specified.

TONKA—Flexible, lightweight general duty hose of braided construction for pressures up to 300 \pm . Easy to handle. Will not kink. All sizes, V_2 to and including 1-inch hose supplied in lengths up to 500 ft. 11_1 and 11_2 -inch sizes in lengths up to 300 ft. and 2-inch hose in lengths up to 50 ft

CHARIOT—Multiple ply fabric, reinforced tube and wear-resisting rubber-covered hose for pressures up to 200#. Available in 50-ft. lengths in all standard sizes from ½ to 6 inches.



CONVEYOR, ELEVATOR AND TRANSMISSION BELTING

Expertly built belts in regular, heat and oil-resisting grades are available for all types of mine transportation or power transmission systems. Republic Belts are supplied in both folded and square-edged construction in endless or continuous lengths.







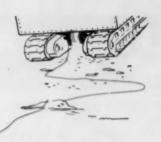
STEAM HOSE

REPUBLIC ASBESTOS—Super duty hose with asbestos cord reinforce ments braided into seamless plies. Heat-resisting tube and cover. Built with static conducting wire when specified. ½ to 2-inch sizes supplied in 50-ft. lengths for continuous service with pressures up to 200x.

REPUBLIC—For pressures up to 150 \pm . Flexible, fabric-reinforced construction available in V_2 to $2V_2$ -inch sizes in 50-ft. lengths. Wire wound when specified.

TOWER—For general service where working pressures do not exceed 100#. Made in V_2 to $1V_2$ -inch sizes in standard 50-ft. lengths.

proved in our mines for better performance in yours

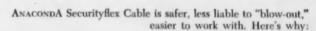


We-at Anaconda-are miners ourselves. We know shovel cable because we use lots of it. Safety and uninterrupted flow of power are important in any mining operation. In both respects we know Securityflex* Type SH-D has a good record.



for longer "failure-free" service on big shovels, insist on

Butyl-Insulated Securityflex above 2kv



BUTYL INSULATION. This accounts for improved resistance to moisture, ozone, heat (up to 80C).

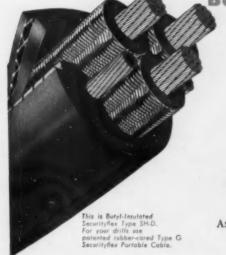
NEOPRENE JACKET. Here is real flexibility and great strength engineered for this specific tough use. Handles well, has high impact resistance and lasts longer in all weather.

RUBBER-CORED GROUND WIRES. This safety-first feature prevents kinking, gives greater shield contact, and cushions the wires.

COPPER-COTTON SHIELD. Special new-type shield makes splicing easier, faster without damage to insulation. Eliminates chafing failures.

Ask your Anaconda Sales Office or Distributor to show you this and other Anaconda portable mining cables. Learn how continuous improvements have made these famous cables better . . . for safety . . . and for increased production at less cost in your mine. Anaconda Wire & Cable Company,

25 Broadway, New York 4, N. Y.



the right cable for the job ANACONDA wire and cable CATALOG, DEVELOPMENT AND DIRECTORY NUMBER, 1954

GENERAL MOTORS

Series 51, 71 and 6-110 DIESEL ENGINES

FOR GREATER DIESEL POWER IN A MORE COMPACT ENGINE, SPECIFY "GM"

Here's the answer to your need for dependable, low-cost Diesel power—General Motors Series 51, 71 and 110 Diesels. Operating on the 2-cycle principle—power at every piston downstroke—these space-saving engines give substantially more power per pound of weight, start on their own safe fuel and run smoothly and cheaply. They respond quickly to varying load demands, are easy to maintain. They use fewer gallons of lower cost fuel and burn it cleaner, with no objectionable smoke or toxic fumes.

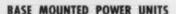


DIESEL

POWER

POWER UNIT ENGINES

Power Unit Engines are available in 2-, 3-, 4- and 6-cylinder models. Right or left side mounting of blower, exhaust manifold and other components. Radiators, power take-offs, flywheel housing adaptors and other accessories may be purchased to adapt it to a variety of installations. Illustrated is Model 6045C.



Short base units are available in 2-, 3-, 4- and 6-cylinder models, enclosed or "open." Long base units with outboard shaft bearing in 3-, 4- and 6-cylinder Series 71 models and the 6-110. Complete instrument panels carry all necessary gauges in handy location. Structural steel bases; GM heavy-duty power take-off with clutch; quick electric starting. Illustrated is Model 6031C, short-base enclosed GM Diesel power unit.



General Motors Diesel Engine—Torque Converter Units with GM converters provide smooth, shockless power for hoisting, industrial locomotives and hauling units. One manufacturer—one responsibility for service and warranty. Available in Series 71 3, 4, 6, "Twin 4" and "Twin 6" models, also in 6-110 and "Twin 6-110" models.

Whatever your need for power, there's a GM Diesel engine to fill it economically and reliably. Over 60 industrial models.

General Motors 2-Cycle Radiator-Cooled Industrial Diesel Engines

Series 51 Engines	Number Cylinders	Bore &	Rated BHP @ 2200 RPM	Rated BHP @ 2500 RPM	Continuous BHP @ 2200
2-51 4-51	4	4.1" x 4.1" 4.1" x 4.1"	34	76	27 54
Series 71 Engines	Number Cylinders	Bure &	Rated BHP @ 1800 RPM 60MM Injectors	Rated BHP @ 1800 RPM 70MM Injectors	Continuous BHP @ 1600 RFM
2-71 3-71 4-71 6-71 Twin 4-71 Twin 6-71 Quad 6-71	2 3 4 6 8 12 24	414" x 5" 414" x 5" 414" x 5" 414" x 5" 414" x 5" 414" x 5"	49 75 104 159 202 311 622	57 85 117 180 229 351 702	42 62 86 131 167 256 512
"110" Engines 6-110 Twin 6-110	Number Cylinders	Bore & Stroke 5" x 5.6" 5" x 5.6"	Rated BHP @ 2000 RPM 90MM Injectors 234 462	Rated BHP @ 2000 RPM 110MM Injectors 274 541	Continuous HHP @ 1809 RFM 210 416

MULTIPLE ENGINE UNITS



Two basic General Motors Series 71 or 6-110 Diesel engines compactly mounted side-by-side and geared to a single drive-shaft form the "Twin 4" or "Twin 6" Diesels. Each engine has an individual clutch and individual as well as synchronized throttle controls. Thus one or both may be in use or "cut out" as desired, giving extreme flexibility of operation. GM Series 71 Diesels also available in "Quad 6," consisting of four 6-cylinder engines mounted on one base and geared to a single shaft. "Twin 6," Model 12103 is illustrated.

DETROIT DIESEL ENGINE DIVISION . GENERAL MOTORS CORPORATION . DETROIT 28, MICHIGAN

DIAMOND CORE DRILLING

a Complete World-Wide Service

"ORIENTED" DIAMOND BITS CORE DRILLING MACHINES All Accessory Equipment for Core Drilling and Soil Samp-ling. See list on 4th page.

DIAMOND CORE DRILLING

— ANYWHERE —
Exploration for Ores and other Mineral Deposits, Foundation Test Boring, Grout Holes, Pressure Grouting, etc.

Over Sixty Years of Successful Experience

SPRAGUE and HENWOOD, Inc.

SCRANTON, PENNSYLVANIA

Bulletin No. 325

DIAMOND CORE DRILLING



DOUBLE-TUBE REAMING SHELL

Available in all standard aizes for use with all types of double-tube core barrels. Special sizes and types as required. Inserts are tough tungstenalloy matrix set with carefully selected diamonds.



SINGLE-TUBE REAMING SHELL

NGLE-TUBE REAMING SHELL Available in all standard sires for use with all types of single-tube core barrels. Larger sires and special designs as required. In order to fill orders promptly for either single- or double-tube ream-ing shells we must know the make and model of the core barrel.



CASING-SHOE BIT

Available in the same wide range of sizes and types as our standard casing bits and designed so that they can be left on the end of the casing in the hole while drilling is continued through them with the corresponding standard size of core barrel and bit.



STANDARD CASING BIT

Available in all standard sizes with a choice of four different matrices and three different grades of selected diamonds. Larger sizes and special designs furnished as required. Must be removed before continuing to drill with core barrel and bit.

"ORIENTED DIAMONDS"

MAKE SPRAGUE & HENWOOD BITS

CUT FASTER -- LAST LONGER

Always a leader in its field, Sprague & Henwood, Inc. PIONEERED the development of ORIENTED Diamond Bits; in which each individual diamond is set with its hardest rib or "vector" toward the work. We have produced thousands of oriented bits, in a wide variety of types and sizes, with both cast and powdered-metal matrices; and have proved, by extensive comparative tests in our own contract drilling operations, that they cut much faster and last much longer than bits in which the diamonds are set at random.

Only selected diamonds of certain crystaline structure can be used and only specially trained and equipped setters of more than usual aptitude can be relied upon to orient diamonds correctly in the mold, but we are now fully organized for efficient production of ORIENTED DIAMOND BITS, at no additional cost to purchaser. In terms of footage cost, these are the most economical diamond bits ever produced and we invite inquiries on that basis. Bulletin No. 320 illustrates and describes all types and gives complete data.



STANDARD CORING BIT

Available in four different matrices and three different grades of correctly-sized diamonds. BX, AX, BX and NX sizes carried in stock. Lerger sizes and special designs furnished to meet eny specifications or requirements.



IMPREGNATED CORING BIT

Especially suitable for drilling through hard, broken or extremely abrained ground, where diamond loss from surface-set bits might be excessive. EX, AX, BX and NX sixes carried in stock. Larger sixes and special designs when required.



HON-CORING BIT

Especially suitable for drilling round smooth holes in rela-tively soft formations, when cores are not required. All standard sizes available in four different types of matrix.



"PILOT" TYPE NON-CORING BIT

Recommended for drilling blast holes in hard formations and also for use when long straight holes must be drilled in variable formations.



"TAPER" TYPE HON-CORING BIT

The fastest cutting bit for drill-ing blast holes in very hard for-mations. All standard sizes.

ROLLER HEAD HEAD REAMER SHELL

SERIES "M" CORING BIT

For use with SERIES "M" Core Barrel, when good cores must be secured from soft or friable strata. Available in all four types of matrix and three different grades of diamonds. Also in a complete range of impregnated sizes. EX. AX. BX and NX sizes carried in stock.

AT RIGHT: Assembly of Series "M"

Double-Tube Core Bartel, showing a

Series "M" Coring Bit in working posttion. The Series "M" Core Bartel was developed by Sprague & Henwood, Inc. to meet the need for a higher percentage of core recovery from soft or friable
material than could be obtained with the standard-type double-tube core bartel. Bulletin No. 330 gives complete information regarding its construction and operation.

SPRAGUE and HENWOOD, Inc.



MODEL CP-55 and MODEL CP-55-A

Both of these light but powerful air-operated machines combine high drilling speed with exceptional durability and dependability. CP-55 is a high-speed machine used for Blast-Hole drilling, while CP-55-A is a slower speed machine for Core drilling.



No. 325 Machine with Pneumatic Rod Puller Rated Capacity—"EX"—300'; "AX"—225'



High-Speed Drilling Machines FOR EVERY MINING REQUIREMENT

To secure best results from our oriented diamond bits, you need drilling machines with plenty of power and a wide range of both speed and feed. The modern Sprague & Henwood machines here illustrated and described not only meet all of those requirements but, in addition, are designed and built to give many years of dependable service at lowest

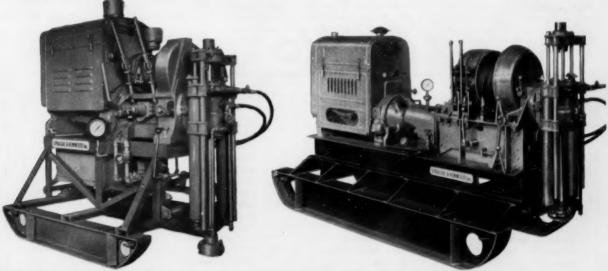
Modern design, rugged construction, anti-friction bearings and liberal use of alloy-steel for all wearing parts, minimize time losses and permit long periods of continuous high-speed operation under the most difficult

Correspondence regarding any present or prospective Diamond Drilling Machine requirement is cordially invited. Our experienced engineers welcome opportunities to make helpful suggestions based on results secured under comparable conditions by our own contract drilling crews.

MODEL 325 and MODEL 550 Air-Operated Machines for Diamond Core Drilling Underground

Driven by four-cylinder radial-type air motors, both of these modern machines have ample capacity for fast steady operation of size "E" drill rod and bits.

Write for Bulletin No. 340



MODEL 40-C Diamond Core Drilling Machine
The Best Machine for Most Core Drilling Jobs

Designed for greatest possible all-round value and performance on jobs up to a thousand feet in depth, no matter how difficult the operating conditions. Rated Capacity—"EX"—1000'; "AX"—800'; "BX"—600'; "NX"—500'. Write for Bulletin No. 185.

MODEL 142 Diamond Core Drilling Machine
For Deep, or Large-Diameter, Core Drilling Jobs
Built "Like a Battle Ship" for tough service and capable of bringing out good cores at far greater depths than its rated capacity, when especially equipped for deep drilling. Rated Capacity—"EX"—2000'; "AX"—1650'; "BX"—1200'; "NX"—1000'. Write for Bulletin No. 160.

CONTRACT Anywhere

DIAMOND DRILLING Any 7ime

For more than sixty years Sprague & Henwood, Inc. has been a leader in the field of Contract Diamond Drilling. During this long period of time our crews have completed thousands of contracts successfully in every corner of the globe—under every conceivable operating condition. Today we have a large force of expert operators and an ample supply of modern equipment, so that we can undertake almost any job—anywhere—on very short notice.

Besides exploratory core drilling, from the surface or underground, our service includes blast-hole drilling, directional drilling, foundation test drilling, grout-hole drilling and pressure grouting. Estimates and constructive suggestions when possible, submitted on request.

ACCESSORY EQUIPMENT

For Diamond Core Drilling and Soil Sampling

In order to meet the requirements of our own contract drilling crews, we are obliged to supply a wide variety of accessory equipment and to carry all of the more important items in stock for immediate shipment. The same prompt service is available to other diamond drill operators and ordering is made easy by a 28-page catalog, No. 31-F, which gives all necessary information, including illustrations, piece numbers, weights, and code words for convenience when ordering by wire or cable. Every operator of a diamond drilling rig should have a copy of Bulletin No. 31-F and we'll send one free of charge on request.

Soil Sampling Devices and Equipment are illustrated and cataloged in our Bulletin No. 75-A (20 pages) which also contains helpful information regarding approved methods of recovering samples for Soil Investigation and Foundation Testing. Write for a free copy if you can use it to advantage.



A Sprague & Henwood Drilling Rig in the Colorado Uranium Field.

PARTIAL LIST OF ACCESSORY EQUIPMENT AVAILABLE

Auger Bits, all types
Bails, lifting
Ball-Bearing Waterswivels
Bits, Diamond
Bits, Blank
Bits, Chopping
Bushings, Rod & Casing
Casing, Flush Coupled
Casing Taps
Clinometers
Corebarrels, all types
Corebarrel Taps

Core Lifters Couplings, Rod Drive Hammers
Drive Heads
Drive Pipe
Drive Pipe Couplings
Drive Shoes
Extensions, Core Barrel
Fishing Tools
Fishtail Bits
Flush Coupled Casing
Foot Safety Clamp
Hoisting Hooks
Hoisting Plugs

Derrick Sheaves

Drill Rods

Hoisting Rings
Hose, Waterswivel
Hose, Suction
Jar Lengths
Jaws, Safety Clamp
Lifters, Rod
Mud Bits
Pilot Reamers
Plugs, Hoisting
Pressure Testers
Protectors, Casing
Reamer Shells
Reducers, Rod

Hoisting Plug Reducers

Rods, Drill
Rod Couplings
Rod Taps
Rose Bits
Safety Clamps
Sawtooth Bits
Sheave Wheels
Soil Samplers
Subs
Taps, Fishing
Testers, Sample
Testers, Pressure
Wash Plugs
Water Swivels

SPRAGUE & HENWOOD, Inc. • SCRANTON 2, PA

NEW YORK . PHILA. . PITTSBURGH . GRAND JUNCTION, COL. . BUCHANS, NEWFOUNDLAND

TRUCO DIAMOND DRILL BITS by Wheel Trueing

TRUCO CORING BITS

Maximum core recovery is normal performance for Truco Coring Bits in all formations. Diamonds are carefully selected, graded and set in a matrix of patented Truco Metal, famous for abrasive resistance and for its "welded" hold on diamonds to prevent loss. Truco Bits hold their gauge throughout their life and maintain proper clearance, thus enabling sludge and cuttings to move freely away from the face of the bit. Exceptionally fast and free cutting; high diamond recovery; very low footage costs. All standard sizes. State make and size of reaming shells or core barrel when ordering.



TRUCO CONCAVE BLAST HOLE BITS

Designed for use in all softer formations where cores are not required. Good for hard use in broken ground. Because the center of solid bits has no cutting speed, these bits are set with special quality center diamonds to take extra wear and prevent breakage. Water hole and groove are specially designed and positioned for maximum clearance of cuttings. Excellent performance in formations where only coring bits have previously worked. All standard sizes. State make and size of reaming shell or coupling when ordering.



TRUCO PILOT BITS

Another bit giving fine performance in formations previously considered suitable only for coring bits. Particularly adapted to variable rock formations where concave bits tend to "wander". Will not mud or ball up; cuts clean and true in soft and hard formations on all standard rigs. Very popular with engineers and drillers on long blast hole drilling and grouting work. The perfect teammate for Truco Concave Blast Hole Bits. All standard sizes. State make and size of reaming shell or coupling when ordering.



TRUCO IMPREGNATED CORE BITS

(no resetting required)

Drillers count on this Truco Bit for fast, economical footage under the roughest hole conditions. It stands up to abuse and keeps going where surface set bits might be affected by impact and abrasion from cherty, fractured and non-homogeneous formations. Fine, small diamonds, evenly distributed throughout the matrix give continuous high performance until all are used up*. Truco Impregnated Bits are set in "H" matrix and require sand-blasting during use. Bits may be run until the diamond bearing matrix is completely used. State make and size of reaming shell or core barrel when ordering.



TRUCO CASING BITS AND SHOES

Ruggedly built and set with carefully selected diamonds properly placed in patented matrix to stand up to rough usage and insure low footage cost from surface to bed rock. Although conditions vary widely and, therefore, costs also, Truco Casing Bits will always prove notably economical. Truco Casing Shoes permit set bit and reaming shell to pass through. Impregnated Casing Bits and Casing Shoes are also available. All standard sizes. State make and size of your equipment when ordering Casing Bits or Shoes.



TRUCO DIAMOND DRILL BITS by Wheel Trueing



TRUCO REAMING SHELLS

Strip type—made to exact tolerances with strips placed in any desired positions. These shells ream accurately and hold gauge to the end of their life. Used with Truco Bits, they insure accurate hole size and eliminate subsequent reaming with bits. Can be run behind a solid bit to minimize vibration.

Ring type shells are preferred by many drillers in hard, broken formations. All sizes available. State make and size of core barrel when ordering.



STANDARD OIL FIELD BIT

In addition to all kinds of mining bits, Truco builds a complete range of oil field diamond drilling products including large bits 9" in diameter and over. The Standard Oil Field Bit, shown above, is for drilling in unknown structures varying from soft limestone and shale to hard, dense sandstone and chert. It is used throughout the oil fields and is also useful for drilling gas wells and water wells. It is a rugged and reliable general purpose bit with a wide range of applications.

When ordering Truco Oil Field Bits always state whether hard or standard matrix is desired; the diamond quality preferred; and the size and type of core barrel being used.

PROMPT and EXPERT RESETTING SERVICE

The promptness of our resetting service enables drillers to keep bits working steadily with little time lost in servicing. Bits are ready for use most of the time and not in the process of being reset. Therefore, fewer bits are needed and less money is tied up in bits.

Diamonds are salvaged from worn bits by an exclusive process which cannot damage them. New diamonds are added and set at critical points of wear. New diamond weight is approximately the same as the quantity lost or damaged in use, and reconditioning, therefore, is simply the cost of new diamonds and resetting.

The exceptional holding qualities of Truco Patented Matrix Metal insures good salvage from Truco Bits and every usable stone is reset to its best advantage.

Before resetting bits, wear and performance data are studied, and our engineers can often make small changes to improve performance in specific applications.

WHEEL TRUEING TOOL COMPANY

3200 West Davison Ave.

Established 1910

Detroit 38, Michigan

WHEEL TRUEING TOOL COMPANY OF CANADA, LTD.

575 Langleis Avenue • Windser, Ontario, Canada

Offices and Branch Offices

Kirkland Lake, Ont.

Hamilton, Ont.

Calgary, Alberta

WHEEL TRUEING TOOL COMPANY OF NEW JERSEY

33 West Street . Bloomfield, N. J.

Offices and Branch Offices

STERLING SALES CO.

Worcester, Mass. Forest Hills, L. I., N. Y. New York, N. Y.

DIAMOND DRILLING DIVISION

3200 W. Davison Ave., Detroit 38, Michigan

DISTRIBUTORS

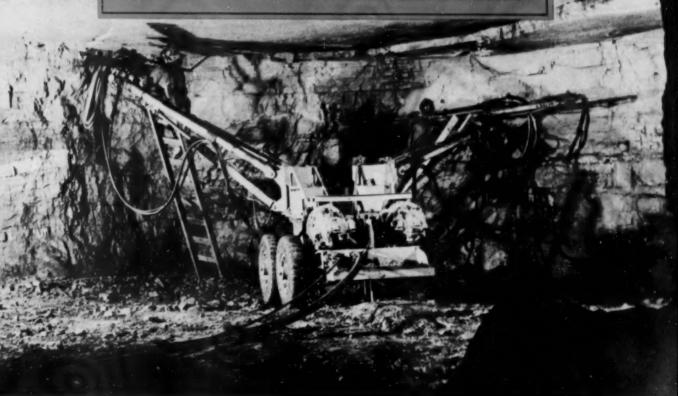
DRILLING & SERVICE, INC.
Dallas, Texas

JOY MANUFACTURING CO.—Pittsburgh 22, Pa. General Offices—Henry W. Oliver Building MINE SUPPLY, INC. Vanadium, N. M.

form No. A-32—1954 226A Write for illustrated catalog and price list of Truco Diamond Drilling Products

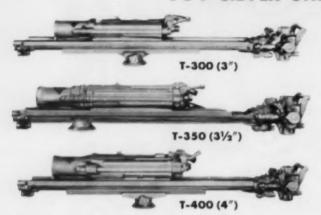
Printed in U.S.A.

JOY PRODUCTS
FOR METAL & NON-METALLIC MINES



JOY MANUFACTURING COMPANY, HENRY W. OLIVER BLDG., PITTSBURGH, PA.

JOY SILVER STREAK DRIFTERS



JOY Silver Streak Drifters are built for long, trouble-free service and fast drilling speeds, resulting from advanced rock drill design. They are the only drills with cadmium plating, inside and out, for better lubrication during run-in, closer clearances, and complete protection from corrosion while in stock. Other exclusive features include the JOY Dual Valve, which "makes air do more work", providing positive cushion control at both ends of the stroke and powerful piston action; and the JOY Piston-motor Feed, which gives smooth, steady advance and safe retraction. Locking Chuck with greater bearing area increases the service life of chuck parts and drill steel, and an efficient Drill Steel Centralizer assures easy, accurate hole spotting. JOY Drifters include the T-300 (3" bore class), T-350 (3½" bore class), T-400 (4" bore class), LM-57 (2¾" bore class), and LM-67 (2½" bore class). ● For complete details, ask for Bulletin 87-D.



S-91T S-91T Closed Extended TELESCOPIC FEED STOPERS

JOY SILVER STREAK STOPERS

Ease of operation, safety, greater footage, and longer service life are the principal advantages of JOY Stopers. In addition, JOY Telescopic Feed Stopers offer long steel changes—the S-91T with 36-inch change from a length of 52" and the SAE-91T with a 30-inch change from a length of 21½". Telescopic feed will, in most cases, speed up drilling by eliminating alternate lengths of steel and will greatly reduce steel inventories. Cadmium plated inside and out for rust prevention and easier running-in. All have the exclusive JOY Dual Valve for cushion control and faster, harder punch. Thumb-flip rotation control makes spotting of holes quick and safe and prevents spinning of the drill when a steel sticks. The complete JOY line also includes the 80-lb. SL-47, the 96-lb. standard S-91, the short-length SA-91.



JOY SULMET ROCK BITS

"The Bit with the Extra Footage"



The Joy Sulmet bit with its hard tungsten carbide inserts offers many advantages—maximum length feeds in hard rock, increased drilling speeds, fewer bit changes and less time lost per hole, no hole taper, and increased blasting efficiency. You can drill continuously with one size bit and with little or no loss of gauge. Improved design allows complete removal of cuttings from the face of the bit, yet practically eliminates squaring of the bit. Precision threads provide for greater thread wear resistance and longer bit life.

Bulletin 87-C.

JOY THROWAY ROCK BITS

"The Bit You Don't Have to Sharpen"

JOY Throway Bits are low cost rock bits made harder to drill farther and faster. They permit use of long feeds and reduce steel changes, saving time and increasing footage per shift. The use of smaller bits with minimum loss of gauge permits smaller, deeper holes and less powder used. Eliminating the need for sharpening equipment results in added savings. • Ask for Bulletin 87-R.



Consult a Joy Engineer for "The World's Most



JOY DRILLMOBILES

JOY Drillmobiles are rubber-tired, self-propelled drilling units designed to meet the needs of trackless mining in the metal and non-metallic fields. Available in three sizes for drilling in any size heading, or in stope work where deposits do not dip too steeply. Drills, on long feeds or standard drifter cradles, are mounted on JOY Hydro Drill Jibs which make hole-positioning easy and accurate. Drills and jibs are operated by remote control from positions away from the face and out of danger. Two reversible JOY Air Motors furnish power for tramming and control the tractor-type steering to make the Drillmobiles extremely maneuverable. • Ask for Bulletin 87-F.



JOY JIB JUMBOS

The JOY Jib Jumbo mounting is a versatile drilling unit for mechanized drilling in drifts up to 9 feet by 10 feet in section. Hydraulic control of one, two or three JOY Hydro Drill Jibs, mounted on a specially designed truck, eliminates hard manual labor, promotes safety, and speeds up the drilling process to meet all the requirements of mechanized mining. Drilling speed is increased through the elimination of steel changes and faster moving of the drills from hole to hole. A roof jack, which exerts a 20-ton pressure vertically against the roof, increases safety by acting as a roof support during drilling. • Ask for Bulletin 87-F.



JOY HYDRO DRILL JIB

for Jumbo Mounting

The JOY Hydro Drill Jib is outstanding in reducing mining costs where the speed and mobility of the drilling unit are primary factors. Features include long drill feeds, remote control of drill and hydraulic control of jib. Highly versatile—can be mounted on a truck or large jumbo for drilling out large headings easier and faster, or otherwise mounted to meet practically any set of local drilling conditions. • Ask for Bulletin 87-F.

JOY HS-15

Blasthole and Core Drill

The HS-15 is the ideal drill for underground blasthole or core drilling. Compact, weighs only 155 lbs. Depth rating of 500' with EX fittings, giving ½" core. Uses plug or core bits. Has "In-line" drive that gives no vibration. Blasthole speeds of 0 to 3300 RPM or 0 to 1800 RPM possible by shifter key. Modification for slower speeds of 0 to 1100 RPM in slow speed range available for deeper core drilling. • Ask for Bulletin D-32.



JOY AIR LEG

for Easy Drilling with Joy Hand-Held Drills

Faster set-up, faster and easier drilling with the JOY Air Leg are made possible by its 28-step pressure regulating feed valve which gives a constant controlled feed regardless of air line pressure. With JOY rock drills it is a well-balanced drilling unit, easily set up and easy to handle while operating. • Ask for complete details.

JOY-LITE

Low Voltage Lighting System

Portable and air driven — brings you the advantages of better light wherever compressed air is available. The JOY-LITE is a low voltage electric system with no shock hazard and which cannot be harmed by short circuits or overloads. Oper-

ates four high-powered sealed-beam spot or flood lights up to 50 feet from the generator. Lamps swivel on tripod stand which can also be used as a column clamp. A hook at the top also serves as a hanger. Designed for continuous duty and low maintenance. Ask for Bulletin 87-1.



JOY CHAMPION BLASTHOLE DRILL

The Joy Champion, a continuous-type rotary blasthole drill, utilizes roller cone bits for drilling and a continuous blast of compressed air for removal of cuttings. Field tests show that high drilling speeds and long bit life result from this combination. Holes up to 7\%" diameter are smooth-walled for more efficient use of powder and easier loading. Rigid drilling stem, controllable feed pressure, and constant rotation speed prevent bit wander. Self-propelled on sturdy crawler treads. Available with either diesel or electric drive. \(\theta\) Bulletin D-36.

JOY CHALLENGER BLASTHOLE DRILL

The Joy Challenger, the largest hammer drill 5\[\lambda'' \] yet designed, will drill 4\[\lambda'' \] diameter holes to depths of 50 feet or more in any type of formation. Available with three mountings: TWM-2, self-propelled by commercial tractor engine and containing hydraulic system and integral dust collector; TWM-2A, self-propelled by two air motors and containing air powered hydraulic system; and TWM-3, complete drill, feed, and brackets for mounting on drill operator's own crawler-mounted tractor. Uses 26-foot feed to give 20-foot steel changes. \(\int \) Details in Bulletin 87-U.





Positive locking brakes permit fast moving, quick set-up and balanced drilling on any terrain with these easily maneuvered wagon drills. They have fast, powerful feed, balanced design and reversible feed motor. Mediumweight model drills to 24' depths or more using 6' steel changes . . . has "Hydra-Lift" hydraulic control. Lightweight operates from 105 CFM compressor, increases drill footage 50% to 80% with L-57 drill. Controls are in easy reach. • Ask for Bulletin 87-T.





JOY SILVER STREAK HAND-HELD DRILLS

The JOY line of Hand-Held Drills includes models from the 27-lb. L-27 to the powerful 65-lb. L-67, which is ideal for mounting on a feed for light drifting. All sizes are cadmium plated for protection from rust while in storage, and to facilitate running-in; and all have the exclusive JOY Dual Valve which "makes air do more work."



JOY SILVER STREAK BREAKERS

JOY Silver Streak Breakers are exceptionally hard hitting tools capable of sustained low-cost breaking. The complete line includes four models from the lightweight K-31 to the heavyweight K-89. They feature the thrifty Dual Valve, cadmium plating, and controlled cushioning. Sturdy side rods insure perfect alignment. • For complete details, ask for Bulletin 87-P.

MINING WORLD



Consult a Joy Engineer for "The World's Most

JOY NO. 12-B CORE DRILL



The JOY No. 12-B Core Drill above at left has a 1000' capacity with E rods and EX fittings; or 800' with A rods and AX fittings. Surface or underground mounting; gasoline, diesel, air or electric drive; hydraulic or screw feed swivelhead. Has hoist for pulling rods. The twin-column mounting shown at right is available with air power. Lightweight, yet rugged, it is easily set up to drill at any angle. Drill can be set at any height on column convenient for each set-up. • Ask for Bulletin D-21.



TRUCO Diamond Drilling Products

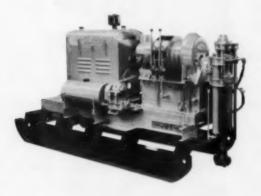


JOY-Truco and Truco core, casing and blasthole bits, and reaming shells, available in standard sizes, are engineered to meet every field condition. Their high-quality materials and workmanship insure a durability that means lowest cost per foot drilled. • See detailed information on Truco and JOY-Truco Bits in this catalog or write for Bulletin D-35.

CORE DRILLING BY CONTRACT

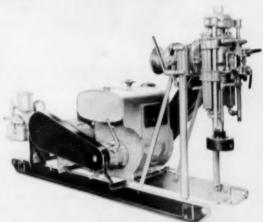
Sub-surface test borings for mineral prospecting and determining suitable locations for dams, bridges, buildings, as well as grout hole drilling, are available on contract basis. Highly skilled crews and complete stock of core drills and accessory equipment are maintained at all times.

JOY 22-HD CORE DRILL



A rugged, heavy-duty machine built for drilling in all formations. Gasoline, diesel, electric, or air powered, equipped with hydraulic swivelhead, built-in oil circulating system and incorporating a large capacity hoisting drum. Powerunit is directly connected to the drilling head through an automotive type transmission and clutch. Mounted on skids, the 22-HD can be quickly and easily disassembled for transport. • Ask for Bulletin D-28.

JOY NO. 7 CORE DRILL



An extremely portable machine, gasoline, electric or air powered, the No. 7 is a full capacity tool, using standard EX or AX fittings, removing full size ½" or 1½" cores. Hydraulic or screw type swivelheads — drills in any direction at any angle — wide range of speeds and feeds — power cathead — multiple disc friction clutches — and simple, safe, easy to reach controls. • Ask for Bulletin D-24.

APRIL 15, 1954

JOY TWO DRUM SLUSHERS





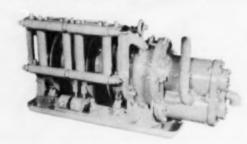
S-211

For light weight, portability and power the S-211 is unequalled. With a rope pull of 1100 lbs. at 150 ft./min., this unit weighs only 275 lbs. and is but 2834 in. long. Flange mounted motor insures permanent, perfect alignment for motor and gearing. 5 HP electric motor or JOY "Turbinair" air-motor drive. Regular equipment includes vertical rope-guide rollers, sheet-steel rope guards and toggle type clutch levers. • Ask for Bulletin 76-Y.

FF-211 "TURBINAIR" SLUSHER

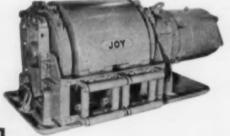


Can be operated by a JOY 7 ½ or 10 H.P. "Turbinair" motor, an 8 H.P. "Pistonair" engine or a 7 ½ to 15 H.P. electric motor, any or all interchanged easily and quickly. Automatic, adjustable, free wheeling brakes are weight accuated band type. Rope pulls from 2000 to 2500 lbs. at 125 ft./min., 1500 to 2500 lbs. at 165 ft./min., or 1240 to 2000 lbs. at 200 ft./min. • Ask for Bulletin 76-Y.



B2F-211

Powered with 15 to 30 HP electric motors. Rope pulls to 4950 lbs. Rope speeds from 200 to 300 ft./min. Drum rope capacity 350 ft. of ½" or 525 ft. of ½". ◆ Ask for Bulletin 76-Y.





Powered with 30 to 75 HP electric motors. Rope pulls to 9000 lbs. Rope speeds from 215 ft./min. to 350 ft./min. Drum rope capacity 625 ft. of %" or 450 ft. of ¾". • Ask for Bulletin 76-Y.



JOY SHEAVE BLOCKS



Joy ball-bearing sheave blocks have all these outstanding features: patented quick-opening snatch block construction; large flared throat opening; heat-treated chrome nickel molybdenum steel sheave wheel that's recessed to prevent binding and to reduce rope wear; heavy duty sealed-for-life ball bearings to take side thrust and radial load; bearings need no lubrication—watertight and dust tight. Eight sizes from 6" to 20" in diameter • Ask for Bulletin 76-D.

AMSCO SCRAPERS



Amsco Scrapers are available in three types—heavy-duty bolted type, lightweight welded type, and lightweight unit type. All three types are made with no-strain construction and a low center of gravity. Larger models can be easily broken down to pass through tight workings. All models are made completely of high (13%) manganese steel—"the toughest steel known"— for extreme resistance to abrasion, and long life. • Ask for Bulletin 76-N.



JOY TWO AND THREE DRUM SLUSHERS





B2F-311

Three drum slushers eliminate the necessity of moving the sheave to change the path of the scraper and make possible scraping in wide stopes and around fillers and obstructions. The B2F-311 is electric motor powered, 15 to 30 HP, with rope pulls to 4950 lbs. and rope speeds from 200 to 300 ft./min. Drum rope capacity is 350 ft. of ⅓". Ask for Bulletin 76-Y.

RF-211, RF-212 AND RF-312

For big open stopes, large capacity transfer drifts, large open-pit scraping jobs, handling stock piles, reclaiming tailings, etc. Heavy-duty construction—planetary gears, external band and shoe type clutches, and direct lubricated bearings are all basic JOY design. Clutch levers are vertical quadrant type. Vertical and horizontal rope guides are standard equipment. 100 or 125 HP electric motors. Rope pulls to 15,000 lbs. and rope speeds to 300 ft./min. • Ask for Bulletin 76-Y.



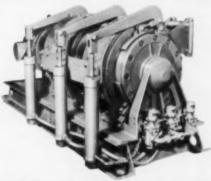


XT-221 AND XT-222

For the most rugged scraping jobs—with 150 HP continuously rated motors. Drums and motor in tandem for narrow width. Rope pull 18,000 lbs.—rope speed 280 ft./min.—weight 18,200 lbs.—length 152"—width 60"—height 70"—rope capacity 600 ft. of 1" or 750 ft. of 1/4".

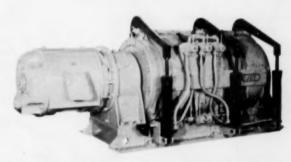
JOY REMOTE CONTROL and COMPRESSED AIR CONTROL SLUSHERS

BF-312 Air-Electric Remote Control



JOY Slushers can be supplied with "air-electric" or "all-electric" remote control clutches. Solenoid valves admit compressed air to actuating cylinders on the "air-electric" models and electro-hydraulic thrusters controlled by magnetic starters operate the clutches on the "all-electric" models. A lightweight, low-voltage, push-button station, that is easily carried, controls both types. • Ask for Bulletin 76-Y.

CF-312 Compressed Air Control



The operator is located at or near the slusher. The advantage of the compressed air control as compared to manual lever control is ease of operation. Small three-way manually operated air valves admit air to the cylinders which actuate the clutch. The three-way air valves will admit air at full pressure or at partial pressure, if desired. This makes the air control as sensitive as a manual lever control. • Ask for Bulletin 76-Y.

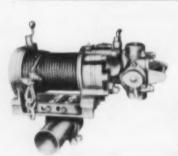
JOY SINGLE DRUM HOISTS



JOY Hoists are all-steel construction, with double-life gears and ball or roller bearings throughout. Safe and easily portable, simple to operate. All "Turbinair" single-drum models have built-in motors and rope pulls from 750 to 3000 lbs. at rope speeds ranging from 75 to 124 feet per minute. Rope capacities range from 350 ft. of 5/16" to 1500 ft. of 3/8" rope.

"Pistonair" models with reversible motors have rope pulls ranging from 1200 to 5000 lbs. and rope speeds from 70 to 125 ft./min. Rope capacities are from 400 ft. of 5/16'' to 1500 ft. of 3/8'' rope. Electric models have rope pulls from 1250 to 2675 lbs.; rope speeds from 110 ft. to 140 ft./min.; and rope capacities from 330 ft. of 5/16'' to 1500 ft. of 3/8''' rope.

● Ask for Bulletin 76-X.



JOY Bantamweight AW-80-8 AIR-WINCH

Light enough for one man to move about, this 90 pound air winch has a thousand uses in the raise, stope, at the face, chute or anywhere lifting or pulling is done. Will lift 800 lbs., can be mounted on car, timber or posts. Positive, sensitive control, reversible piston-type motor, anti-spin band brake. Ask for Bulletin 76-H.

JOY AIR MOTORS



The JOY "Turbinair" Motor, right, has lowest air consumption per horsepower of any type motor. Simple and compact, it delivers smooth, even power. The JOY "Pistonair" Motor, left, is a highly efficient, reversible type unit with a long life of trouble-free operation. • Ask for Bulletin 76-B.

JOY CARPULLERS

For spotting cars, pulling a trip of mine cars past a loading point or other heavy pulling jobs. Fully enclosed working parts—anti-backlash brakes to prevent overspinning—automatic, motor-shaft brake holds cars on grade when motor is not running—Alemite pressure fittings for easy lubrication.

• Ask for Bulletin 76-S.



MINING WORLD



Consult a Joy Engineer for "The World's Most

JOY 18-HR-2 High Capacity Continuous Type Rock Loader

This heavy-duty unit loads up to 12 tons a minute and economically maintains maximum loading rates in flat-bedded deposits, tunnels, high-speed drifts and draw holes. Ruggedly built to withstand abuse of handling hard, abrasive rock and ores, it is standard equipment in iron ore, limestone, potash, gypsum, salt and bauxite mines; is also used in many lead-zinc mines. JOY gathering mechanism assures efficiency. Universal chain conveyor, 29¾ wide, swings 45° either side to facilitate loading of shuttle cars and mine cars. Choice of two conveyor lengths: 12′ 7¾ with 7′ 10½ elevated discharge clearance; or 15′ with 10½ clearance. Ask for Bulletin J-108.

GENERAL SPECIFICATIONS

Maximum capacity, 12 tons/min.—Overall height, 65½" (12½' conveyor) or 87" (15' conveyor)—
Total width, 6' 6½"—Total length, 25' 8½" (12½' conveyor) or 27' 11¾" (15' conveyor)—Main driving motor, 75 HP—Conveyor motors (two), 7½ or 15 HP each—Hydraulic pump motor, 4 HP.

JOY Scraper Loader

Fast loading in low workings is accomplished with minimum operating costs with a JOY "Lohite." Especially useful for driving development headings when top or bottom must be taken. Powered with JOY slusher, the "Lohite" loader fills cars to capacity without conveyor belt or hand shovel for spreading rock in car. No double tracking or hand mucking in wide headings, no temporary track needed. Tail rope speeds up to 40% faster than pull rope speeds. Interchangeable air or electric motors. • Ask for Bulletin 76-A.

APRIL 15, 1954

JOY 60-SERIES SHUTTLE CARS



This JOY 60E12 Diesel Electric Shuttle Car has both electric and hydraulic disc brakes; dependable, 24-volt battery starting; and an exhaust conditioner approved by the U. S. Bureau of Mines. Power to three 15 HP electric motors is supplied by an 82 HP, selfcontained diesel engine, direct-connected to a 50 Kw generator. • Ask for Bulletin J-202.

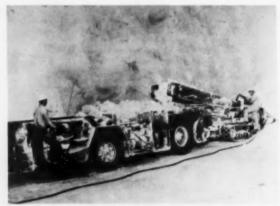
SPECIFICATIONS

Drive Cable	Cable Reel	
Capacity, cu. ft235 or 285	220	285
Height54" or 60"	40"	60"
Width7' 10"	9' 1014"	8' 1"
Length24'	26' 4%"*	25'
Conveyor Width40"	56"	40"
Wheel Base9'	9'	9'11"
Inside Turn Radius 11' 10"	13' 4"	12' 10"
Ground Clearance 1116"	8"	13"
Weight (empty) lbs23,900	25,700	30.000
Tram speed, mph (empty)4.1 (loaded)3.1	4.1	7.5 6.0

*with hydraulically adjustable elevated discharge. Length with low straight discharge is 24' 634". *also available as cable reel car of same dimensions, with provisions for later conversion to diesel drive.



JOY 60E Shuttle Car with Automatic Hydraulic Cable Reel unloads zinc ore into a hopper. This car can be equipped with three 10 HP or three 15 HP motors; has both mechanical and hydraulic disc brakes.



JOY 60E12 Diesel Electric Shuttle Car receives discharge of salt from JOY 18HR-2 Loading Machine.

Series 60 Shuttle Cars are heavy-duty units designed for fast, low-cost transfer of ore and rock, from loader to main haulage systems, in deposits of average height. They carry up to 14 tons, and are available with hydraulic cable reel, trolley or diesel electric drive. All have hydraulic, power-boosted steering. Chain conveyor bottom of each car speeds loading and unloading. Two traction motors and one conveyor motor provide ample power. Replaceable deck plates protect car from abrasive materials. For complete details on how JOY Series 60 Shuttle Cars can increase production and lower costs in your operation, see your JOY representative . . . Bulletin J-200.



JOY KNOCKDOWN INTERMEDIATE SECTIONS and IDLERS



Rugged knockdown type intermediate sections are available for all conveyor belt widths. Compact for low-cost transportation, these versatile production line units are easily and quickly assembled into a finished installation by the user at the site. Joy also offers deep laced trussed frame intermediate sections for above-ground applications.

SHAKER CONVEYORS

JOY Shaker Conveyors will move material in inclines up to 15%, over rolling and dipping mine bottoms without spilling. Cushion stroke reduces shock loads on all parts, adds greatly to the life of each unit. Series UN conveyors are narrow units with the pan running over the drive. The US-12½ is designed for very thin seams. The USN-17 is a low-height, high-capacity drive—incorporating a straight-line drive arrangement which obviates the necessity for a drive troughing section.

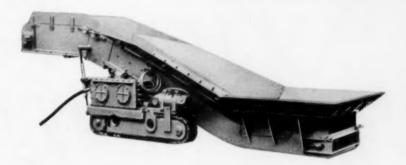
JOY BELT CONVEYORS

Joy Belt Conveyors are available in either single pulley or tandem pulley drives for all belt widths, and in a wide range of power, to meet almost every mining application, whether underground or on the surface. Standard models, ranging from 15 to 300 H.P., include the MTB tandem-pulley drive with extended discharge for underground gathering and haulage; the MB direct-connected, totally-enclosed single head pulley drive, particularly adaptable to handling sticky materials, or for slopebelt installations requiring large horse-power; and the Model C, single head-pulley drive for gathering and haulage in low-tonnage mines, or for use as an extended discharge.



PL11-18 ELEVATING CONVEYOR

The PL 11-18 is a caterpillar-mounted, mobile elevator especially designed for use with shuttle cars in driving tunnels and mine workings. Heavy, plated sides and bottom will readily stand up under heavy or abrasive ores.



JOY AXIVANE" BLOWERS

for Mine and Tunnel Ventilation

JOY AXIVANE* Portable Blowers are setting records for lowcost ventilation wherever they have been installed. These allpurpose, two-in one units operate with unmatched efficiency through any length of tubing. No longer is it necessary to have two types of blowers for different sections of the mine or tunnel— JOY AXIVANE* Blowers are equally suitable for either high or low pressure duties. For complete details, ask for Bulletin J-607.



A JOY Series 1000 AXIVANE* Fan clearing dust and smoke from the face in a tunnel operation



Model I-21 Portable Blower. For high or low pressure operation through any length of tubing.



Model I-19 Blower may be equipped with air drive if no electric power is available.

JOY AXIVANE® FANS

the Pioneer Vaneaxial Fan

JOY AXIVANE* Mine Fans are designed for lower speed operation, which reduces noise, increases life and simplifies lubrication. Other features include wide range of blade adjustment and simultaneous adjustable blades, eliminating guesswork settings. JOY Fans can be kept at peak efficiency, even when air demand increases or decreases considerably. Ask for Bulletin J-603.



JOY AXIVANE® Mine Fan at a copper mine.

*Reg. U.S. Pat. Off.



BELT-DRIVEN SERIES 1000

HIGH

PRESSURE

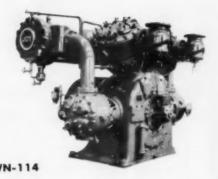
FAN



MINING WORLD

Consult a Joy Engineer for "The World's Most

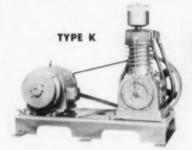
JOY AIR COMPRESSORS







"100" Series Compressors are made in 2-cylinder (WN-112) and 4-cylinder (WN-114) sizes. Twin units (single motor) to 3896 CFM. Heavy duty, 2-stage, double-acting, water-cooled, compressors have "Dual Cushion" valves, replaceable cylinder liners and crosshead guides, full force-feed lubrication and other outstanding features. Minimum installation preparations needed for these JOY Compressors. For complete details, ask for Bulletin A-72 "INDUSTRIAL-AIR" compressor (WG-9) is a vertical, singlestage, double-acting, heavy-duty water-cooled unit. Made in 15 cylinder sizes with capacities from 172 to 881 CFM., and pressures from 30 to 150 lbs. per square inch. 100% force-feed lubrication, easily replaceable cylinder liners and crosshead guides, and long life "Dual-Cushion" valves. Requires only a simple block type foundation. • For complete details, ask for Bulletin A-43.





JOY Aftercoolers are specifically designed to remove water-vapor and entrained oil from compressed air by effectively condensing and isolating the vapor and oil. Air delivered is cool, dry and clean. For complete details, ask for Bulletin A-27.



The JOY Type K Compressor, air-cooled and single-acting, is available in either one or two cylinder units, either single or two stage. Extremely light and compact, Type K Compressors range in capacity from 2.0 to 47.0 CFM, with motor horsepowers from 1/4 H.P. to 10 H.P. Maximum continuous pressure up to 175 p.s.i. Available with sub-base mountings, bare or with compressor and motor mounted on the receiver. Ask for Bulletin GG-5H.

"Unitair" (WL-80) two-stage, air-cooled units are available in eleven sizes, from 15 to 125 H.P., with piston displacements from 81 to 641 CFM. for maximum pressure of 125 lbs. p.s.i. Compactness and vibration-free operation keep foundation requirements to a minimum. . For complete details, ask for Bulletin A-56.



JOY Series 80 Portable Air Compressors are available in a wide range of sizes and models, from 75 to 630 CFM. Modern, streamlined and efficient, they feature concentric-type dual-discharge valves, WK-80 FOUR WHEEL DIESEL DRIVE



long-life heavy-duty main bearings, force-feed lubrication. An "Econo-miser" load-control that automatically regulates engine speeds in accordance with air demands is standard equipment on all sizes except the models 75 and 125.

• For complete details, ask for Bulletin A-55.

APRIL 15, 1954

ELECTRICAL CONNECTORS FOR METAL MINING

Job-proven through years of faithful service JOY electrical connectors have earned many outstanding commendations in the Metal Mining field. No matter what the electrical connection problem (in open pit and underground mining) a JOY plug and socket combination will provide the right solution. Compactly molded as one-piece Neoprene units they will not crack under hard impact and are highly resistant to adverse climatic or mining conditions. Connectors permanently attached to cable jacket through taper-neck vulcanization providing additional strength at this vital point. this vital point.

THE WATER-SEAL — When connected, contacts on all JOY plugs and sockets illustrated in this bulletin are automatically enclosed in a protective Neoprene housing. This excludes moisture and other impurities that raise resistance and shorten the average connector's life span.

LEAD LENGTHS — All JOY Male and Female Connectors are supplied with lengths of cable as specified by customers. Receptacles in table 2 are terminal back with lugs for attachment.

PUSH-PULL (Single Conductor)



(top to bottom)



- MALE PORTABLE
- FEMALE PORTABLE
- FEMALE RECEPTACLE

PUSH-LOCK (Molded to Cable)



OVAL STYLES ALSO AVAILABLE WITH 3 CONTACTS





- MALE PORTABLE
- **FEMALE PORTABLE**
- MALE MACHINE RECEPTACLE
- FEMALE WALL RECEPTACLE

	TABLE I	- 900-AOL	A. C. or D. C.		
SINGLE	E CC	NDU	CTOR	STYL	FS

	8	PUSH-PULL STYLE		PUSH-LOCK STYLE		
A. W. G. WIRE SIZE	TYPE OF CONNECTOR	Son y	51		51	
	Male	104M	104MIPX1	1D375M	1D375M2X1	
8	Female	104F	104FIPX1	1D375F	1D375F2X1	
,	Male	105M	105MIPX1			
6	Female	105F	105FIPX1	IMPOR	TANT:-	
2	Male IOOM IOOMPXI				connector	
3	Female	106F	106FIPX1	supplied on first for sizes. Specify cabl		
•	Male	107M	107MIPX1	size desired.		
2	Female	107F	107FIPX1			
,	Male	108M	108MIPX1	_	-	
1	Female	108F	108FIPX1			
0/0	Male	110M	110MIPX1	1D500M	1D500M2X	
2/0	Female	110F	110FIPX1	1D500F	1D500F2X1	
4/0	Male	112M	112MIPX1	1D625M	1D625M2X	
4/0	Female	112F	112FIPX1	1D625F	1D625F2X1	
400	Male	_	-	1D750M	1D750M2X	
MCM	Female		-	1D750F	1D750F2X	

(*) Also available for 5000-volt application. To order add suffix "X" to 600-volt numbers. Example: 106M + X = 106MX, etc.



MALE PLUG ILLUS

PUSH-LOCK (Attachable)

Same as Molded-to-Cable design on preceding page except has screw type wiring terminals for cable!

AWG	MALE	FEMALE
2	1D375M76	1D375F76
2/0	1D500M76	1D500F76
4/0	1D625M76	1D625F76
400MCM	1D750M76	1D750F76
500MCM	1D875M76	1D875F76



PUSH-LATCH DESIGN

Same one-piece molded Neoprene construction as other JOY designs except equipped with metal coupling with ears that hook together during connecting process. This permits free-stringing (i.e.), engaged connectors need not be tied together or otherwise protected to prevent tugs or jerks on cable from pulling them apart.

AWG	MALE	FEMALE	MALE	FEMALE
	2 Cond. No	n-Polarized	2 Cond.	Polarized
18	B2A093M	B2A093F	*******	
12		********	B2A156M	B2A156F
10	B2A187M	B2A187F	828187M	828187F
8	B2A250M	B2A250F	B2B250M	B2B250F
6	B2A312M	B2A312F	B2-312M	82-312F
4	B2A375M	B2A375F		

AWG	MALE	FEMALE
	3 Conducto	or Polarized
10	83-187M	83-187F
8	B3A250M	B3A250F
6	B3C312M	B3C312F

TROLLEY POLE CONNECTORS

Molded Neoprene construction. Prefabricated assemblies (Male and Female) available in lengths to suit individual needs. Receptacle mounts on locomotive. Choice of wire sizes indicated.

 Wire Size
 Plug
 Receptacle

 2/0
 110FT
 110MTX1

 4/0
 112FT
 112MTX1

on. Prefabricated vailable in lengths practe mounts on es indicated.

MALE RECUTACLE

OMTX1

2MTX1

	0	VAL 3	& 4 C	ONDU	CTOR S		
A. W. G. WIRE SIZE	TYPE OF CONNECTOR	THAT S	(1)		THE THE PARTY OF T	(1)	
	Male	330M	330MMF	330MR	431M	431MMF	431MR
14	Female	330F	330FMF	330FR	431F	431FMF	431FR
	Male	341M	341MMF	341MR	441M	441MMF	441MR
10	Female	341F	341FMF	341FR	441F	441FMF	441FR
_	Male	342M	342MMF	342MR	442M	442MMF	442MR
8	Female	342F	342FMF	342FR	442F	442FMF	442FR
	Male	352M	352MMF	352MR	452M	452MMF	452MR
6	Female	352F	352FMF	352FR	452F	452FMF	452FR
	Male	362M	362MMF	362MR	462M	462MMF	462MR
3	Female	362F	362FMF	362FR	462F	462FMF	462FR
	Male	372M	372MMF	372MR			_
2	Female	372F	372FMF	372FR			-
	Male	A3A500M	SHROUD	ED STYLE	A4A500M	SHROUD	ED STYLE
1	Female	A3A500F			A4A500F		
	Male	A3A625M	8	8	A4A625M	8	18
2/0	Femule	A3A625F	(0)	0	A4A625F	600	aso)
			~			-	
PROD	OUCT CATION	Used on I for Lights Sticks.		nd as outlets hovel Dipper	Used on 1 In portable Power Out	Distribution St	ffls, etc steps and es

(**) Also available for 5000-volt application. To order insert "X" before numerals in 600-volt numbers. Example: 10375M+X=10X375M.

(†) Flat base styles illustrated. Also available with curved base for motors, etc. Specify if wanted.

CABLE JACKET VULCANIZERS



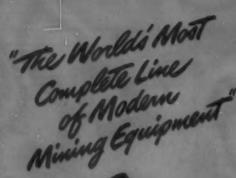


MOLDS AVAILABLE FOR ALL STANDARD CABLE SIZES

Electric immersion type heaters generate steam for heating mold. Heat control is fully automatic. Has safety "popoff" steam valve. Available in five standard sizes.

STRING-A-LITE lighting lines provide a safe, portable lighting system for stoping operations, advanced headings, and other out-of-the-way needs. Available with safe power connections and a choice of three light styles. Complete details in Bulletin SL-202.

Consult these JOY REPRESENTATIVES for Joy Products





DOMESTIC AND EXP

DOMESTIC OFFICES	EXPORT OFFICES
Calif. Los Amingham	
Calif San Rangeles 22	
Colo De Francisco 3	5426 F. (Crandall Eng. Co.
III Chi	
Mass Biddlesboro.	Fifth and Chester
Mich Boston 15.	North 1 Division Street Fifth and Chesnut 560 W Mashington Blvd. 609 N. 19th St. 88 Brookline Ave.
Mann., Duluth 2	88 Brookline A
Mo., St. Louis 10.	14225 Schaefe- Ne.
Mont., Butte.	
OL New York 6	1021 East Superior St. 1203 Macklind Ave. 24 W. Granite St. 140 Cedar Street
Ohio, Cleveland 13	24 W. Grani Ave.
Pa., Forty Fort.	
Tex., El Paso	1631 N.W. Thurman St. 155 Welles St. 4107 Sennott St. 1420 Walnut St. 108 W. Main Ave. 6540 Hines Blvd.
Wash., Seattle 4	1022 Wines Blvd.
V. Va. Fairmon	
V. Va. Hungin	Silv First Ave., So.
radington 14	
APORT OFFICES	P. O. Box 1046

	742 P:-1
New York . At a.	Eighth Ave
Lord I, N. Y.	
London WI Fools	*******
Paris Feet Lingland	
A France	**** Empire State Div
Anderlecht-Remark	State Bldg.
Johannest Brussels, Belgium	Carlos Place
The Sourge S. Africa	Rue de Ct
osebery, N.S.W A	Steele Se Contain
lie de l' Chile	(Alrica) (Ptv.) I.d.
de Janeiro. Readit	56-58 Rochart 37 Ltd.
and in Meria	Casilla DC D
asablanca, Fr. Mon-	Caixa Postal SA C
ma. Per	4 D. Copacabana
, reid.	" Rue Charles Vall
	P. Vallin
IOV	Rue de Verdi
	New York 1, N. Y. London WI, England Paris, France. Anderlecht-Brussels, Belgium ohannesburg, S. Africa. V. Dola, Nor. Rhodesia. Rosebery, N. S. W., Australia. antiago, Chile. io de Janeiro, Brazil ligers, Algeria. asablanca, Fr. Morocco. ma, Peru.

JOY MANUFACTURING COMPANY (CANADA) LIM

Alb., Calgary	Beverly Stree	7, GALT, ONTARIO	LIMITED
Nova Scotia Sud-	***********	ONIARIO	
Ont., Kirkland I	V	***************************************	2.1.
Ont., Sudbury		3402	and Ave., East
Ont., Toronto	***********	3402	Esplanade Ave.
Que., Montreal	************		Duncan Ave.
The state of the s	***********	3402	D Eyre Street
1011		***************************************	Dundas St. W.

JOY-SULLIVAN MACHINERY CO., S. A. Ramon Guzman 132, Mexico, D. F., Mexico

AND MORE THAN 500 DISTRIBUTORS THROUGHOUT THE WORLD

JOY REPRESENTATIVE IS ALWAYS

Bulletin No. M-204

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

Euclid Equipment for metal and non-metallic mines





EUCLID DIVISION

GENERAL MOTORS CORPORATION
Cleveland 17, Ohio



"EUCS" BELONG IN YOUR PROFIT PICTURE! and
15-TON Model UD
and
15-TON Model FD
Rear-Dump EUCLIDS
Standard and
Quarry Types



The 10-Ton "Euc" fills the need for a smaller capacity hauling unit for heavy duty service in mines, quarries and other off-the-highway work. Body size and capacity balance efficiently with $\frac{3}{4}$ to $1\frac{1}{2}$ yd. loading shovels.

The 15-Ton Euclid is engineered and built for lasting strength on a wide range of work. The sturdy body is constructed to withstand the impact and wear of loading overburden and heavy excavation.

Both models have the double reduction planetary Euclid drive axle . . . body plates are extra thick and are reinforced by heavy box section side and bottom supports. Semi-rigid or spring-mounted drive axles permit greater speed. Plenty of power and traction for steep

grades and tough hauls . . . speed on the haul road and dump . . . dependable long life performance.



Model UD: Capacity 20,000 lbs. . . . 6.6 cu. yds. standard body . . . 5.9 cu. yds. quarry body . . . 125 h.p. engine . . . loading height — 7' 2" and 7' 4". Travel speed, loaded — 36.3 m.p.h. Tires, front — 11.00 x 24; drive — 12.00 x 24 duals. Transmission, 10 ferward and two reverse speeds.

Model FD: Capacity 30,000 lbs.... 9.7 and 11.1 cu. yds.... 165 to 200 h.p... loading height, quarry body, 8' 5", standard body — 8' 2". Travel speeds loaded up to 28 m.p.h. Tire sizes — 12.00 and 13.00 x 24, front; 14.00 x 24 and 16.00 x 25 duals, rear. Hydraulic booster steering. Five or 10 speed transmission.

Both models with Euclid double reduction, planetary drive axle.

22-TONModel TD
Rear-Dump EUCLIDS
Standard and
Quarry Types

Separation And September

CAPACITIES . . . 14 and 14.8 CU. YDS. . . . 275 or 300 H.P.

These units provide high speed hauling and large capacity for big shovels and draglines. Body plates are extra thick and strongly reinforced by heavy box section side and bottom supports. Top edges and front of body protected with heavy angles. Frame is built of heavy "!" beams. The quarry type has flared sides and tapered chute. High dumping angle and double acting twin hoists on both units assure fast, clean shedding of load. Enclosed cab gives good visibility for spotting at the loading unit and dumping point.



SPECIFICATIONS

Standard Model has a capacity of 14.8 cu. yds. and a loading height of 9'. Quarry type has a capacity of 14 cu. yds. . . . loading height, 8' 9". Both units have a loaded capacity of 44,000 lbs. . . . 275 or 300 h.p. Diesel engine . . . travel speeds up to 32.5 m.p.h. . . . tires 14.00 x 24 front and 18.00 x 25 on duals, rear . . . Euclid double reduction, planetary drive axle, either semi-rigid or spring-mounted . . . 10 speed transmission or torque converter and semi-automatic transmission . . . hydraulic booster steering . . . top extensions to increase standard body capacity available as optional equipment.

MINING WORLD .



EUCLID DIVISION GENERAL MOTORS CORPORATION

34-TON Model FFD 50-TON Model LLD Rear-Dump EUCLIDS CAPACITIES ... 20 and 32 CU. YDS....68,000 and 100,000 LBS....380 or 400 H.P. and 600 H.P.

Designed for mining and construction jobs where large tonnages must be moved on tough off-the-highway hauls. Powered by two diesel engines of 190, 200 or 300 h.p., each driving one of the rear axles through a torque converter and semi-automatic transmission. There is no clutch pedal or manual shifting of gears . . . operator can change to the proper gear range under full power at any travel speed. Top speed with full payload is 31.6 m.p.h. Two planetary drive axles are mounted on free-floating springs to permit fast travel speeds. Easy steering and comfortable riding qualities assure maximum driver comfort.

SPECIFICATIONS

Model FFD struck capacity 20 cu. yds. . . . two 190 or 200 h.p. Diesel engines . . . two torque converters and Torqmatic transmissions . . loading height 9'6'½" . . . all tires 16.00x25 . . maximum speed loaded 28.8 m.p.h.

Model LLD struck capacity 32 cu. yds. . . . two 300 h.p. Diesel engines . . . two torque converters and Torqmatic transmissions . . . loading height 10'10" . . . all tires 18.00x33 . . . maximum speed loaded 31.6 m.p.h.

Both models have hydraulic booster steering and Euclid double reduction planetary drive axles, spring mounted.

13 CU. YD.,
17 CU. YD.
and
25 CU. YD.
Bottom-Dump EUCLIDS

CAPACITIES . . . 40,000 to 78,000 LBS . . . 190 to 300 H.P.

These large capacity units can be loaded quickly by power shovels, draglines, conveyors, transfer bins, and mobile loading equipment. Euclid wedge-shaped hopper provides good weight distribution, important for traction on difficult hauls. Wide, full-length doors and smooth, steep hopper sides assure quick, clean dumping. Simple but rugged design and construction . . . exceptional maneuverability.

SPECIFICATIONS

13 Cu. Yd. Model . . . has a capacity 40,000 lbs. . . . 190 or 200 h.p. Diesel engine . . . 5 speed transmission . . . loaded top speeds to 32 m.p.h. loading height, 8′ 9″ . . . tires 12.00 x 24, front, and 24.00 x 25 drive and trailer wheels.

17 Cu. Yd. Model . . . capacity 52,000 lbs. . . . 260 or 275 h.p. Diesel engine . . . 10 speed transmission . . . loaded top speed 28.2 m.p.h. . . . loading height, 9' 9" . . tires 12.00 x 24 front, and 24.00 x 25 drive and trailer wheels.

25 Cu. Yd. Model . . . capacity 78,000 lbs. . . . 275 or 300 h.p. Diesel engine . . . 10 speed transmission . . . loaded, top speeds to 27.3 m.p.h. . . loading height, 10^{\prime} 7 $^{\prime}$ /₂ " . . . tires 14.00 x 24, front, and 27.00 x 33 on drive and trailer wheels.

. CLEVELAND 17, OHIO, U. S. A.



12 CU. YD.

and

15.5 CU. YD.

EUCLID

SCRAPERS

CAPACITIES . . . 12 and 15.5 CU. YDS. STRUCK . . . 16 AND 21 CU. YDS. HEAPED . . . 190 to 275 H. P.

Euclid Scrapers have set an entirely new standard for design and performance . . . have features that assure high production at low maintenance cost. Safe positive steering, ample power, traction and flotation provides fast loading and travel speed on grades and soft fills. Lever actuated independent control of bowl, apron and ejector eliminates all but the 13' of cable used on the apron lift. Both models have 4 section adjustable and reversible cutting edges. Many components, such as drive axle, hitch, frame etc., are the same as used in thousands of "Eucs" that have proved their dependability on the toughest jobs.

SPECIFICATIONS

12 cu. yd. scraper . . . 190 or 200 h.p. . . . 5 speed transmission . . . top speed loaded 26 m.p.h. . . . 21.00 x 25 drive and scraper tires.

15.5 cu. yd. scraper . . . 260 or 275 h.p. . . . 10 speed transmission . . . top speed loaded 28.2 m.p.h. 24.00 x 25 drive and scraper tires.

Both models have hydraulic booster steering and lever action of all scraper operations.

18 CU. YD.
TWIN POWER
EUCLID
SCRAPER

CAPACITY . . . 21 CU. YDS. at 3:1 . . . 24 CU. YDS. at 1:1 . . . 380 or 400 H.P.

The Twin Power Scraper self loads in a short travel distance in practically any material. Good bowl design, short pull arms and adjustable 4-section cutting blades provide excellent digging action. Simple, compact hydraulic system and lever action of all scraper operations are exclusive Euclid features. The two engines are synchronized through separate torque converters and can be used individually or in unison. The "Twin" is a versatile and efficient "one-man-gang" for overburden removal, ore and refuse hauls, stock piling and reclamation . . . it's the only scraper that is its own pusher!

SPECIFICATIONS

Form No. 54 MC

Litho in U.S.A. 54230



EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio, U.S.A.



The ATLAS CAR & MANUFACTURING CO.

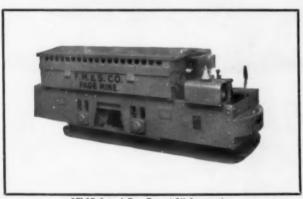
Designers and Builders of Mine Haulage Equipment

1100 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

The Type "J" is easily transported from one level to another on the usual mine cage. Overall length is 41½"

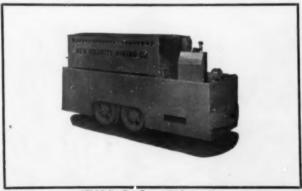
METAL MINING LOCOMOTIVES

TYPE "J." The Atlas Type "J" Storage Battery Locomotive is intended for tramming service. This 1½ ton locomotive meets all modern requirements for metal mining tramming service. It is equipped with a totally enclosed spur gear drive that has been proven the most efficient of any locomotive drive. It is mounted on ball bearings running in an oil bath. Frame is arc-welded and of rigid modern design. Battery box is completely removable as a single unit. Chilled iron wheels are standard equipment but rolled steel or steel tired wheels can be furnished. This tramming locomotive is of rugged design, using the highest quality materials, accurately assembled. These locomotives are in service today, showing outstanding service records at the lowest maintenance cost. For complete specifications, write for Bulletin No. 1270.



ATLAS 3 to 4 Ton Type "A" Locomolive.

TYPE "A." The Atlas Type "A" Storage Battery Locomotive is built for main line haulage in metal mines. It is furnished in 3 and 4 ton sizes, for 18 in, track gauge and in any desired size for wider gauges. In this locomotive will be found all of the features contributing to the most efficient performance, including: the Atlas totally-enclosed spur gear drive, arc-welded frame construction, series-parallel and split-field control for the two powerful motors, lever type quick-acting brake shoes and equipped with antifriction bearings throughout. Like all Atlas Locomotives, it offers a rugged, substantial design manufactured of the highest quality materials accurately assembled. In addition to the above outstanding features, this locomotive is guaranteed to do more work on a battery charge than any locomotive of its size on the market. Complete details and specification on the Type "A" available on request.



ATLAS 21/2 Ton Type "K" Locomotive.

TYPE "K." This Atlas 21/2 ton storage battery locomotive is specifically designed to solve intermediate mine haulage problems. It embodies all the engineering and field design experience acquired in 45 years of building metal mine haulage equipment. The Type "K" is equipped with an Atlas totally enclosed spur gear drive. The powerful brake shoes are mounted so as to be protected from wheel wash and water. Bearings are of the anti-friction type. Battery box is removable as a complete unit for charging or when used with a spare battery box, allowing the machine to be kept in continuous operation. Special attachments, equipment, or designs necessary to meet a particular mine operating condition, can be furnished on this, as well as all Atlas Mine Locomotives. Complete data regarding other details of the Type "K" will be sent at your request.



FOR YOUR PRODUCTION

Our shops are known to mining men throughout the world for custom building of mine cars and other haulage equipment. Here are some of the standard and custom designed items made by Card. For complete information, write or phone.

Frequently modification of a standard Card

car will serve to meet every specification of special haulage at very little more than the cost of a standard car. Our engineers can show you how to standardize your mine haulage with cars that are custom built for you alone. Many mine operators find they cannot afford even to make car



End Dump Turntoble Type I

All-steel Rotary Dump Car

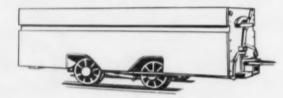


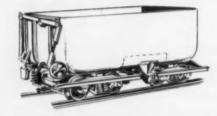




All-steel Rotary Dump Car

Large Capacity Granby Car with Mechanical Brakes





Bicycle Speke Sheaves

Card Roller Bearing Truck

Card Timken Bearing Truck

Coal Mine Cars Ore and Industrial Cars Mine Car Wheels & Trucks Sheaves - Rope, Knuckle, Curve Truck Rope Rollers, Slope Rollers

Carrying Sheaves, Swivels, Hitchings

Loading Booms, Landing Chairs **Automotic and Plain Cages** Skips and Dumps

Revolving Screens **Perforated Screen Plates** Trucklanders

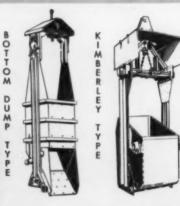
Track Turnouts

Frogs, Crossovers, Guard Rails **Split Switches** Switch Stands Track Turntables Rail Sections and Parts



Standard Rope Sheaves, Heavy Pattern

Card Autamatic Skips



Be your production large or small, Card can fit your needs-

HAULAGE Pick a winning

bodies and repair parts...Card prices are lower even after freight costs are added.

Note the partial list of customers below. Some are now replacing original orders after 10 - 20 years...with Cards, of course.



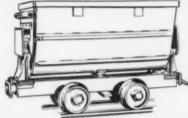
A Popular Granby-Type Car



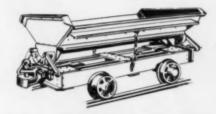
Rocker Dump Car

Rocker Dump Car, extra low

Gable Betfam Type Car



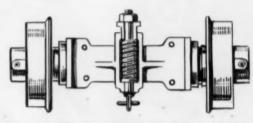
Spring Mounted Bolster Truck



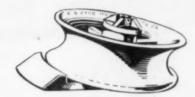
Patented Spring Drawbar Truck



Card Curve Sheave



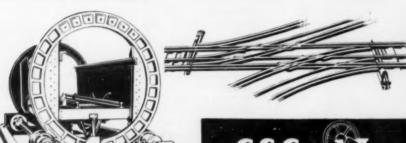
Roller Bearing Track Rope Roller



Card Power Driven Rotary Dump



Example of Card Track Equipment



INTERNATIONAL MINERALS PHELPS DODGE KENNECOTT COPPER U. S. VANADIUM U. S. POTASH VERMONT COPPER HOWE SOUND CALERA MINING HOMESTAKE TELLURIDE MINES IDARADO CANANEA CONSOLIDATED ANACONDA
VICTOR CHEMICAL WORKS CLEVELAND CLIFFS IRON
POTASH CO. OF AMERICA
CONSOLIDATED MINING &
SMELTING CO. OF CANADA
AMERICAN SMELT. & REF. UNITED STATES SMELT. REF. GENEVA COAL CO. INDEPENDENT COAL & COKE TUNGSTEN MINING NEW JERSEY ZINC

CLIMAX MOLYBDENUM

C.S. Card Fron Works Co.

2501 West 16th Ave.
Denver, Colorado



You're ahead 3 ways:

Al. Easier Drilling

2. Greater Footage

3. Lower Costs

- with LeRoi-CLEVELAND
AL90 Air Leg and H10AL Drill

and exclusive feed control!

TALK about a cost-cutter

this is it! It's the lightweight Le Roi-CLEVELAND

Let your miners use it with the Le Roi-CLEVELAND H10AL Drill and, mister, they do any underground drilling job easier and faster. They can use this air leg and drill combination as a stoper—they can use it as a drifter—they can use it as a sinker.

It's a tool miners like to use. The air leg not only supports the drill, but also provides feeding pressure. And the leg absorbs any recoil. Miners' work is easier; they are less tired at end of the shift.

But that's not all! The feed control is built in — eliminates the necessity for a third hose and cumbersome "Y" connections. There's no feed-control bleed valve — the operator does not have to continually bleed-off air, to maintain suitable feeding pressure. He can change or advance the position of the leg easily and quickly.

Increase your footage — lower your drilling costs — ease the load on your men. Put the versatile Le Roi-CLEVELAND AL90 Air Leg and H10AL Drill to work for you. Write today for complete information.

RD-51



CLEVELAND ROCK DRILL DIVISION

LE POL COMPANY

A Subsidiary of Westinghouse Air Brake Co.

12500 Berea Road . Cleveland 11, Ohio

Plants: Milwaukee, Cleveland and Greenwich, Ohio





UNIVERSAL

The JR-38 combines important new features never before available in an air-feed-leg unit. Can be used as a stoper—a drifter—or a Jackhamer. Gives new speed and convenience in setting up, collaring, drilling and hole blowing. Available with 2', 3' or 4' feed legs.



DRIFTERS

Light-weight D-50 Drifter Combination saves time and labor in small headings and flathole stoping. Includes powerful D-50 Drifter, fast PF-3 power feed, aluminum shell, aluminum alloy arm and clamps and pneumatic column.



CARSET

Pioneered by Ingersoll-Rand the Carset Jackbit drills faster, has negligible gauge wear, practically eliminates bit changes, saves manhours all along the line.



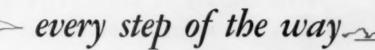
SLUSHER HOISTS

I-R's complete line of highly efficient, low maintenance air or electric driven slusher and scraper units covers every requirement for underground or surface mining. The two-drum, air-powered unit shown above is used for scraping muck into a vertical raise approximately 220 ft from the face.



CENTRIFUGAL PUMPS

I-R centrifugal pumps have proved their outstanding economy and dependability under the most severe conditions of mine service. Each of the four-stage, 500 hp units shown handle 800 gpm at 1700 ft head in a centralized drainage system for a group of copper mines.





INGERSOLL-RAND SPEEDS MINERAL PRODUCTION

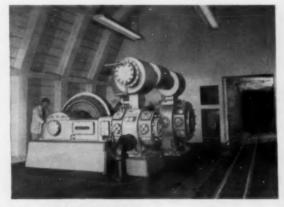
... with over 80 years of specialized experience in serving the metal mining field

During this time Ingersoll-Rand has developed and perfected an extensive line of specialized mining equipment. Our worldwide staff of field and factory engineers has acquired an unequalled background of experience in meeting and overcoming the countless production problems entailed in mining.

This wealth of experience, and this complete line of proven equipment, are at your service. Whatever the problem, your Ingersoll-Rand representative may be able to help you find the one best solutionbe it equipment, application engineering or field service.

- . ROCK DRILLS
- COMPRESSORS
- AIR TOOLS . TURBO BLOWERS
- - CENTRIFUGAL PUMPS
 - . DIESEL AND GAS ENGINES

CONDENSERS



AIR COMPRESSORS

I-R stationary and portable compressors are preferred the world over as a source for dependable, low cost air power in mining service. The 400 hp PRE unit shown above is located underground, 6000 ft from the portal.



TURBO BLOWERS

I-R Turbo-Blowers have built an enviable performance record for long, trouble-free service in metal refining and smelting plants. The six units shown above, installed in a large copper converter plant, have a combined capacity of 157,000 cfm at 15 psi.

MIDGETS FOR MINES

JEFFREY AERODYNE MIDGET FANS

Low height . . . Streamlined . . . Totally Enclosed and Permissible Types . . . Furnished complete with starters for standard power characteristics.

11/2 H.P.
2600 C.F.M.
A.C. or D.C.
Totally Enclosed
or Permissible
Weight — 135 lbs.
Free Delivery Volume

5 H.P.
6200 C.F.M.

A.C. or D.C.

Totally Enclosed or Permissible Weight — 500 lbs.

Free Delivery Volume

Write VENTILATION DIVISION for details.



IF IT'S MINED, PROCESSED OR MOVED
...IT'S A JOB FOR JEFFREY!

ESTABLISHED 1877

MANUFACTURING CO.

Columbus 16, Ohio

sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA.



CHRISTENSEN PRODUCTS

CATALOG SD-503-A

FEBRUARY, 1954

1937 SOUTH 2nd WEST PHONE 84-5231 SALT LAKE CITY, UTAH

Diamond Bit Sizes

STANDARD SPECIFICATIONS CHART FOR CHRISTENSEN DIAMOND BITS, REAMING SHELLS, CASING SHOES, AND CASING BITS

NZE	**** *** ***	MENSIONS :.005	REAMING SHELL DIMENSIONS	CASING SHOE		CASING BIT E	
	O.D.	I.D.	O.D.	O.D.	I.D.	O.D.	I.D.
XRA	1.155	.735	1.175	*******	******	******	******
XRT	1.155	.735	1.175	1.500	1.190	1.500	1.000
LM	1.406	.845	1.426	*******	******	******	******
EX	1.460	.845	1.485	1.865	1.500	1.865	1.405
EXE	1.460	.905	1.485	*******	*******	*******	******
EXH	1.460	.845	1.485	*******	*******	*******	*******
EXK	1.460	.905	1.485	*******			
EXL	1.460	.845	1.485	******	*******	*******	******
EXM	1.460	.845	1.485		*******		
EXT	1.460	.905	1.485			*******	******
					100000		
AB	1.720	Concave	1.750	******	******	******	******
AX	1.865	1.185	1.890	2.330	1.905	2.330	1.780
AXC	1.885	1.067	1.890	******	*******	******	******
AXD	1.865	1.136	1.890				140444.00
AXH	1.865	1.185	1.890	*******	*******	******	
AXK	1.865	1.281	1.890	*******			******
AXL	1.865	1.185	1.890		*******		
AXM	1.865	1.185	1.890				
AXT	1.865	1.281	1.890	*******	*******	*******	******
BX	2.330	1.665	2.360	2.945	2.375	2.945	2.21
BXC	2.355	1.432	2.360	*******			******
BXD	2.330	1.615	2.360	*******	*******		
BXH	2.330	1.665	2.360	*******	*******	*******	******
BXL	2.330	1.665	2.360	*******	********		
BXM	2.330	1.665	2.360	********		*******	,,,,,,,
NX	2.945	2.155	2.980	3.595	2.995	3.595	2.84
NXC	2.975	1.875	2.980	******	*******		******
NXD	2.945	2.060	2.980	*******	*******	******	*****
NXH	2.945	2.155	2.980	*******	******		111111
NXL	2.945	2.155	2.980	*******	*******		
NXM	2.945	2.155	2.980		*******		
NC	3.615	2.730	3.650	*******	*******	*******	

When ordering specify the size, style, and manufacturer of core barrel or casing in use.



Casing Shoes

TYPE 494

Casing shoes are used for reaming over stuck tools, for reaming hole and for drilling in casing before reducing size of hole. Casing shoes are set without inside gauge stones in order that bit and reaming shell may pass, thus eliminating necessity of removing the casing from the hole. Illustrated is Type 494 EX casing shoe, no waterways, regular matrix, "B" grade bortz, 25 per carat size, about 8.00 carats. Both casing bits and casing shoes may be set with regular, hard or extra hard matrices.



Casing Bits

TYPE 275

Casing bits are commonly used for collaring holes and for reaming a hole for casing. Since diamonds are set on both the inside and outside gauge, passage of a corresponding size bit or shell is not permitted. It is recommended that both casing bits and casing shoes be used without waterways. Illustrated is EX casing bit Type 275, regular matrix, "B" grade bortz, 25 per carat, approximately 12.00 carats.



It might be noted that any modification can be incorporated in either the casing shoe or the casing bit should the customer so desire. Specify when ordering: Size casing — type of casing; standard flush coupled or flush joint. For complete list of sizes refer to page 254.

Write for Casing Shoe and Casing Bit Price List



Core Bit

TYPE 4207

EX Straight Wall Coring bit, 2 waterways, 100 per carat, B grade bortz, about 4.50 carats, regular matrix. This bit is recommended for drilling extremely hard solid igneous and metamorphic rocks in which diamond polishing causes premature retirement of the bits.



Core Bit

TYPE 100

AX Bevel Wall Core Bit, 8 waterways, 15 per carat, B grade bortz, hard matrix. This bit gives fast penetration in soft sediments and is especially recommended for sticky shale. Diamond content 12.00 carats.



Core Bit

TYPE 4339

AXM Core Bit, 4 per carat congo bortz, G grade, maximum diamond exposure, hard matrix. This bit is suitable for drilling soft sedimentary rocks where rapid penetration makes sludge removal an important factor. About 21.00 carats.

For Complete List of Sizes Refer to Page 254.

Write for Core Bit Price List.



Christensen Also Manufactures a Complete Line of Core Barrels — Write For Your Copy

Core Bit

TYPE 429

EX Bevel Wall Core Bit, 2 waterways, 40 per carat, A grade, regular matrix, maximum diamond exposure. This bit is recommended for non-abrasive formation when a small diamond is used and when sludge removal is imperative.



Core Bit

TYPE 4746

AX Series D face Discharge Coring Bit, 4 ports, no waterways, extra hard matrix, 25 per carat, A grade bortz, about 11.5 carats. Recommended for maximum core recovery in broken and severely abrasive rocks. May be made with waterways and discharge ports, and may be supplied for the C, H, M and L series core barrels.



Core Bit

TYPE 1720

AX Bevel Wall Core Bit, hard matrix, 25 per carat, A grade bortz, no waterways, approximately 12.5 carats. For moderately abrasive rocks, where rock is free cutting, and where maximum diamond concentration is desired.

For Complete List of Sizes Refer to Page 254.



Write for Core Bit Price List.

Christensen Also Manufactures a Complete Line of Core Barrels — Write For Your Copy

- LESS COST PER FOOT -



Reaming Shell

BALANCED TYPE 5708

The balanced type reaming shell, originated by Christensen Diamond Products Company, continues to set new records for drilling economy. A newer design, utilizing Christensen's extra hard matrix metal further increases the life of the reaming shell. On the leading edge is a continuous band of abrasion resistant metal to resist the cutting action of sludge. Several rows of diamonds set in the powdered metal matrix at evenly spaced intervals provide the reaming action necessary. Special sizes and tapers are available. Illustrated is Type 5708 BX double tube reaming shell, balanced type, for Joy double tube rigid core barrel, with 6.50 carats "B" grade bortz.



For customers who prefer the insert or strip type reaming shell, Christensen will continue to carry this design. Insert strips are $\%'' \times 1\frac{1}{2}$ " in size and contain $1\frac{1}{2}$ carats drilling bortz, 15 per carat, set in extra hard matrix. Illustrated is Type 616 BX reaming shell for Christensen double tube rigid core barrel, set with two inserts.



The addition of tungsten carbide grit hard facing or tungsten carbide inserts to the reaming shell blank is available if conditions warrant. This prevents premature retirement of the shell due to excessive erosion on the reamer shell blank. Illustrated is Type 6085 BX reaming shell, balanced type, with hard facing for the Joy double tube core barrel, with 6.50 carats, B grade bortz. There is an additional charge for Tungsten Carbide Grit Facing or Chrome Plating on Reaming Shell Blank.

For Complete List of Sizes Refer to Page 254.

Write for Reaming Shell Price List.







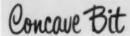


Concave Bit

TYPE 641

Concave diamond bits are used for purposes of drilling where no core is desired. They can be used profitably for drilling blast holes, drain holes, holes for grouting and drilling cement.

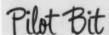
Illustrated is type 641, EX Concave bit, approximately 10.8 carats, 25 per carat size, A grade diamonds, one waterhole, one reinforced waterway, regular matrix. This type is usually the fastest cutting type non-coring bit. Used in drilling limestone, rhyolite or porphyry. For harder granitic rocks smaller size diamonds in this type are recommended.



TYPE 769

The Concave bit can be used for exploration drilling through the rock formation until the mineralized zone is reached; from this point on the core bit can be used. Christensen Concave bits will drill almost any rock which can be cut with a coring bit.

Illustrated is type 769, LM Concave bit, 25 per carat size stones, B grade diamonds, 2 waterholes, no waterways, about 9.75 carats, regular matrix. Bits of this design drill well in dolomite, rhyolite, porphyry, granite and tactite. May be furnished with rod pin or box thread.



TYPE 2870

A modification of the Christensen Concave bit, Pilot bits are especially valuable for drilling straight holes in steeply dipping strata, and in drilling perimeter holes in tunnel enlargements. Illustrated is type 2870 EX Pilot bit, one waterhole, one waterway, regular matrix, 25 per carat size A grade diamonds, approximately 11.50 carats.

Specify when ordering either concave or pilot bits: Bit size — manufacturer's type of reaming shell in use, or other matching connection — type matrix — special requirements, such as additional waterholes. Unless otherwise specified first quality diamonds will be used.

For Complete List of Sizes Refer to Page 254.

Write for Concave and Pilot Bit Price List.









Sales and Service

MAIN OFFICE AND FACTORY

CHRISTENSEN DIAMOND PRODUCTS COMPANY 1937 South Second West Salt Lake City, Utah Phone 84-5231

St. Louis, Missouri
A. E. Augustson
8587 St. Charles Rock Road
St. Louis 14, Missouri
Phone WAbash 2-6672-J

FOREIGN

R. B. M. LONG PTY. LTD. 201A George Street Sydney, Australia

LILESTONE AND COMPANY, INC. P. O. Box 3368 Manila, Philippines

MINAS, SONDEOS Y EXPLORACIONES C. A. Edificio Atlas No. 504
Puente Republica
Caracas, Venezuela

W. E. GRAHAM Casilla 13119 Santiago, Chile

ASSOCIATED COMPANIES

CHRISTENSEN DIAMOND PRODUCTS COMPANY (FRANCE)
24 Boulevard Gallieni
Villeneuve-la-Garenne
Seine, France

NIPPON CHRISTENSEN DIAMOND PRODUCTS COMPANY 28, 4 Chome Higashi Kamata Ohta-Ku, Tokyo, Japan

MOVE MORE PAYLOAD AT LOWER COST

with <u>bigger</u>, lighter, more durable equipment built better with modern steels

To increase production and to reduce costs, progressive operators are turning more and more to big capacity equipment. And for obvious reasons. For example, labor costs are the same to operate a 25 or 30 yd. dragline as they are to operate a 10 yd. unit. Similarly, bigger trucks—teamed with other big capacity equipment—permit more uninterrupted loading by the shovel which means more output with no increase in man power. In short, big capacity equipment boosts output—increases tons per man shift—cuts costs.

Your mining equipment requires more than large size to ensure profitable operations

But to ensure top performance, to pay off as it should, big capacity equipment must have something more than increased size alone. It must have the stamina to stay on the job—under all conditions, day in and day out. To obtain such dependability, many mining

officials are making increasing use of more durable, more efficient steels: High strength steels like USS COR-TEN, USS MAN-TEN, USS TRI-TEN and USS Abrasion Resisting Steel; or special alloy steel like USS CARILLOY T-1 Steel.

Modern steels supply the special properties needed to keep big capacity equipment working

With these superior steels, stripping, loading and haulage equipment can be given the particular qualities it needs to do its job best. With USS COR-TEN, MAN-TEN or TRI-TEN steels—which have a yield point 50% higher than that of ordinary structural steel—you can increase the strength of a part without increasing its weight. Or you can reduce its weight without reducing its strength. With USS COR-TEN steel you can obtain from four to six times the resistance to atmospheric corrosion of structural steel.

With USS TRI-TEN steel you can ensure high resistance to shock at sub-zero temperatures. With USS A-R steel you can provide increased resistance to wear and abrasion. And with USS CARILLOY T-1 you can obtain super-strength, ability to withstand tremendous shock loads even at arctic temperatures, plus weldability in the field under all conditions.

With these steels used in vital parts ordinarily prone to failure, your power shovels, walking and auxiliary drag lines, scrapers, bulldozers, trucks, tractor trailers and conveyors can be built to handle bigger payloads and can be kept running longer with fewer breakdowns or stops for service and maintenance. The result? Greater tonnage output for the same wage dollars. In other words, more profitable operation.



THIS BIG BABY can scoop up as much as 30 cu. yds. of overburden at one bite. This means it has to take a lot of pounding and abrasion. And it can—because it was built with USS TRI-TEN steel which insures high resistance to impact and shock at low temperatures, high strength, and good welding properties.



UNITED STATES STEEL

With these HIGH-EFFICIENCY STEELS you can increase capacity, prolong life, reduce maintenance, get peak production from your equipment

USS COR-TEN STEEL

What particularly distinguishes USS COR-TEN steel is its unusually high resistance to atmospheric corrosion-4 to 6 times that of plain steel, 2 to 3 times that of copper steel. This property helps to assure long life and low maintenance cost of equipment subject to corrosive elements.

USS COR-TEN steel is a ductile, low-carbon chromtum-nickel-silicon-copper-phosphorus steel having a minimum yield point, in thicknesses of 1/2" and under, of 50,000 psi-at least one and one-half times that of structural carbon steel.

It has a minimum tensile strength of 70,000 psi in these same thicknesses. Its resistance to abrasion, shock and impact is superior to structural carbon steel. Its fatigue resistance—that is, its ability to withstand vibration stresses—is 60% greater.

USS COR-TEN steel is produced in all standard products-plates, shapes, bars, sheets, strip and special cold formed sections. It is recommended particularly for application in light and intermediate thicknesses.

USS MAN-TEN STEEL

USS MAN-TEN steel is a grade of copper-manganese steel that, at relatively low cost, provides high strength and toughness plus workability and weldability in a higher degree than obtainable in carbon steel of the same strength level. Its atmospheric corrosion resistance is slightly higher than that of copper

USS MAN-TEN steel has a minimum yield point and a tensile strength of 50,000 psi and 75,000 psi respectively in thicknesses up to 1/2" inclusive.

Its abrasion resistance is greater than that of structural carbon steel (ASTM A7). Its fatigue strength is approximately 40% higher, insuring longer life under the vibration and reversal of stresses to which many types of mine equipment are subjected.

USS MAN-TEN steel is produced in plates, shapes, bars, sheets, strip and special cold formed sections. It is particularly recommended for use in light and intermediate thicknesses.





USS COR-TEN STEEL used in the 150 ft, boom of this dragline has reduced weight 30%—permits the machine to operate at full capacity, to excavate to great depths and to hoist and load its 10 cu. yd. load without overbalancing the equipment or over-loading the motors.

U S S TRI-TEN STEEL

This tough, versatile steel is especially noted for its unusual ability to withstand shock at sub-zero temperatures.

Because of its very good welding properties in intermediate and heavier thicknesses, this grade of steel is particularly recommended for applications in heavy

duty equipment where maximum ruggedness and strength with minimum weight are prime requisites. In large booms, heavy duty truck frames, buckets, bulldozers, power shovels, etc., it has proved itself over long

periods of severe use.

USS TRI-TEN steel has a yield point of 50,000 psi min. and a tensile strength of 70,000 psi min. in thicknesses ½" and under, with moderately lower values as thicknesses increase up to a maximum of 4". It has greater resistance to abrasion than structural carbon steel (ASTM A7) and its fatigue resistance is 50% higher. TRI-TEN'S resistance to atmospheric corrosion is slightly superior to copper steel.

perior to copper steel.

USS TRI-TEN steel is produced in plates, structural shapes, bars and bar shapes.

USS A-R STEEL

Here is a low-cost, abrasion resisting steel that was developed especially to meet the needs of the mining and other materials handling industries.

USS A-R steel is a carbon-manganese steel, with better workability than plain carbon steel of the same hardness level. Its surface hardness ranges from 200 to 250 Brinell.

A-R steel has many applications in the mining field. Its use has lengthened the life of such equipment as chutes, buckets, conveyors, screens, picking tables, separators, skid plates, etc.

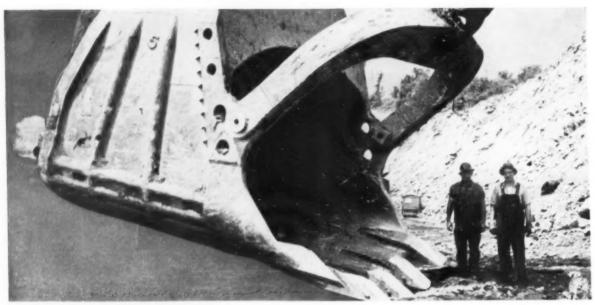
USS A-R steel is available in strip, sheets, universal mill plates, sheared plates and bars and bar shapes. It can be machined, drilled, sheared, punched, welded and hot and cold formed, although certain precautions and special equipment are sometimes necessary because of the product's exceptional hardness.



HERE USS A-R STEEL helps to reduce costs. Its superior hardness means longer service life and less maintenance for chutes, sluiceways, conveyors and other equipment used for handling coal, sand and similar materials.



When your equipment requires STRENGTH far beyond the ordinary



USS CARILLOY T-1 STEEL

First used in the dipper stick and dipper of the world's largest power shovel, this remarkable new steel was especially developed to meet the most severe service requirements. Here is a steel with a unique combination of properties including far higher strength than has ever before been available in weldable plate steel and which has superior toughness as well.

CARILLOY T-1 is a low carbon alloy steel heat treated with great precision, having a minimum yield strength of 90,000 psi in plates ½" to 6" inclusive. Despite its very high strength, CARILLOY T-1 will remain strong and ductile at any climatic temperature, has performed successfully at 40° and 50° below zero. What is more, the full strength of T-1 Steel can be utilized in designing welded construction because its high physical properties are not lowered by welding or gas cutting. And because it can be welded in the field, T-1 construction makes it unnecessary to shut down costly, big capacity equipment for the many hours generally required for shop repairs.

CARILLOY T-1 is primarily intended for use in plate form but may also be furnished as bars. Its nominal hardness is about 250 Brinell but for wear and abrasive applications requiring high hardness and toughness plus good weldability, T-1 Steel can be furnished heat treated to 321 minimum Brinell.

MOVING MORE than a million yards of overburden per month, this mammoth 45 yd, bucket has a lip plate of CARILLOY T-1 Steel. Lospite the punishment it receives, service life has been greatly extended by the use of T-1 Steel. As a result, the manufacturer of these big shovels has standardized on CARILLOY T-1 Steel, not only for dipper lips, but for dipper sticks, and for the entire buckets including bales and doors.



USS CARILLOY T-1 STEEL used in the dipper stick of this mammoth shovel and in the back and sides of the dipper itself made it possible to reduce weight by 30,000 lbs. and to replace the original 35 yd. dipper with one of 40 yd. capacity. This 14% increase in dipper size means a 14% increase in shovel output but,—because of the weight saved by building lighter with CARILLOY T-1—this increased capacity is obtained with no increase in front end weight and with no more power needed for shovel operation.

For complete information write our nearest office

UNITED STATES STEEL CORPORATION, PITTSBURGH

- AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA GENEVA STEEL DIVISION, SAN FRANCISCO
- NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS

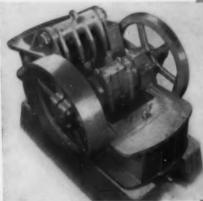


A TRAYLOR LEADS TO GREATER PROFITS



MACHINERY FOR THE MINING INDUSTRY

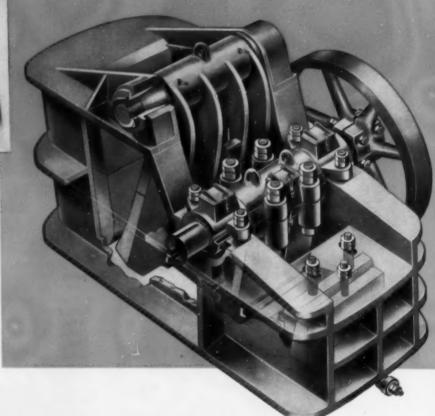
H and HB Bulletin = 5105



Traylor CURVED Jaw Plates are scientifically proportioned so that the faces are opposed to the line of motion. Lifting and churning is reduced . . . power is used more efficiently. Choking is prevented by the increasing size of each succeeding feeding zone. Traylor curved jaw plates outwear conventional plates, often by as much as 3 to 1.

Traylor JAW CRUSHERS

These jaw crushers are of advanced design, built to stand up under hard usage. Numerous improvements give them high efficiency and great capacity. Their features include a patented swing jaw suspension and curved jaw plates, which allow for greater capacity at finer setting and longer life of wearing plates. All frames are reinforced at critical points to provide strength without excessive weight. When it is necessary to make frames in more than one piece, the sections are joined in a manner to preserve single casting rigidity. All parts are readily accessible.



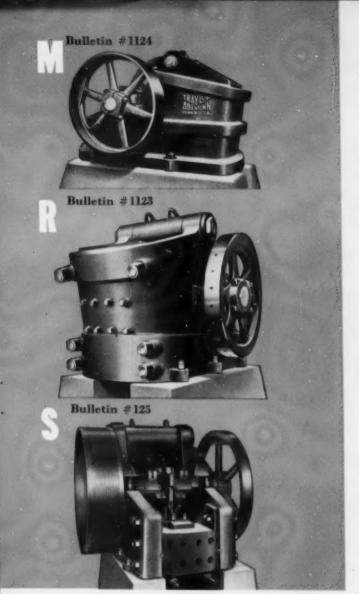
TRAYLOR TYPE H JAW CRUSHER SPECIFICATIONS

Size Feed Opening	Approx. Shipping Weight				15 1	BET T	O THI	CAPAC E SIZE VEIGH	S SH	OWN	BELO	W-II	N TOP	IS OF		LBS					Size	Size	Max.	Size Feet
(Inches)	(Pounds)	Max.						DISC	HARG	E OP	ENING	I-CL	OSED	-INC	HES						Pulley (Inches)	Flywhee! (Inches)	H.P. Req.	Opening (Inches)
		R.P.M.	34	1	134	134	13/6	154	2	234	23/2	3	334	4	434	5	6	7	8	9				
8 x 12 10 x 16 10 x 20 15 x 24 15 x 36 24 x 36 30 x 36 Special 30 x 36 30 x 42	8,000 13,000 16,000 24,000 30,000 47,000 65,000	300 300 300 278 275 250 250	10	11 12	6 12 18 21	7 14 17 23 29	8 16 20 27 33 46	9 18 22 31 38 53 88	10 20 25 34 43 61 77	23 28 38 46 09	34 42 53 77 95	50 62 93 114	72 109 132	125 150	166						48 x 8 48 x 8 46 x 10 60 x 10 72 x 14 72 x 14	48 x 4 48 x 4 48 x 4 60 x 5 80 x 5 72 x 6 72 x 6	15 15 20 30 40 60 75	8 x 12 10 x 16 10 x 20 15 x 24 15 x 30 18 x 36 24 x 36 30 x 36
Special 36 x 36 30 x 42	86,000 73,000 88,000	250 250 200						66	77	112	95 125	105 114 180	122 132 175	140 150 200	158 169 225	175 275	210 300				72 x 14 72 x 14 78 x 18	72 x 6 72 x 6 78 x 10	80 80 100	30 x 36 Special 30 x 36 30 x 42

TRAYLOR TYPE HB JAW CRUSHER SPECIFICATIONS

36 x 42 36 x 48	100,000 128,000	178			140 150							375				78 x 10 78 x 10		36 x 42 36 x 48
42 x 48	155,000 245,000	180 120		1	165	196	220	250	275	300	350	400	450		96 x 20	96 x 12	150	42 x 48 48 x 60
86 x 72	440,000	95					200	315	350	380	450	515	500	640	144 x 36	144 x 14	250	56 x 72

o Horsepower varies with the size of the product, output and hardness of material.



TYPE M CRUSHER SPECIFICATIONS

Size Opening	Approx. Shipping	Apprex. Ca Sizes Shev	en Be	low	-In	Tor	s of	200	O Lt	1,-1		rini				4.5
	Weight	Max. R.P.M.			0	LO	SED	SET	TTI	NG-	-IN	CHE	28			HE T
(Inches)	(Lbs.)	Driving Pulley	34	1	136	134	134	194	2	214	214	3	334	4	434	
8 x 12 10 x 16 10 x 20 15 x 24 15 x 30 18 x 36 24 x 36	8,250 11,700 12,500 25,300 27,000 51,700 70,400	300 300 300 275 275 250 250	4 10	5 11 14	6 12 15 21	7 14 17 23 29	8 16 20 27 33 46	9 18 22 31 38 53 68	10 20 25 34 43 61 77	38 48 69	34 42 83 77 95					10 15 20 30 40 60 75

^{*}Horsepower varies with the size of the product, output and hardness of material.

TYPE R CRUSHER SPECIFICATIONS

Size Opening (Inches)	Apprex. Shipping Weight	R.P.M.		Disc	harg vn B erial	e O	peni - Ir feigh	ng i	8 Se 10 of 100	t Te	Who Siz	88		H.P.
	(Pounds)	Max							_	INC	HES			関語
			2	254	3	334	4	434	5	-	7	8	9	
36 x 42	125,000	175	120	140	160	180	200	225	250					115
36 x 48	133,000	160	130	150	175	200	225	250	275	325	375			125
42 x 48	176,000	150		105	190	220	250	275	300	350	400	450		180
48 x 60	264,000	120			220	250	280	310	340	400	450	500	550	180

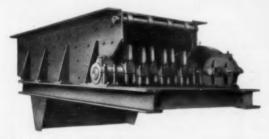
^{*}Horsepower varies with the size of the product, output and hardness of material.

TYPE S CRUSHER SPECIFICATIONS

Size Opening (Inches)	Approx. Shipping Weight	c. R.P.M.	000	ppro peni if 20	100	Capa s Se Lb.— Cu	Ma bic I	eria Foot	es 8	reigh en C	Who Ba	100 ed	Libe	Ton		ar. H.P.
	(Lus.)	P.V.	2	21/4	-	334	-		-	6	7	8	9	10	11	ZĒ
36 x 42	124,200	175	120	140	100	180	200	225	250							115
36 x 48	132,200	160	130	180	176	200	225	250	275	325	375					125
42 x 48	197,200	150		165	190	220	250	275	300	350	400	450				150
48 x 60	304,700	120			220	250	280	310	340	400	450	500	550			180
56 x 72	470,500	95				200	315	350	380	450	515	580	640			250
54 x 84	562,500	90						450	500	580	650	730	820	910	1000	300
60 x 84	563,500	90						480	500	580	950	730	820	910	1000	300

^{*}Horsepower varies with the size of the product, output and hardness of material.

THE RIGHT FEEDER WILL INCREASE YOUR CRUSHER PRODUCTION



GRIZZLEY FEEDERS

This is a machine with a bed composed of several sets of bars placed on edge. Adjoining bars, attached to opposing eccentrics, produce an alternate, reciprocal movement which advances the material to the crusher. Undersize is separated by falling between these bars which are topped with renewable manganese plates suitably slotted for the desired screening action. The churning motion provides a steady feed of material for high crusher efficiency. Made in sizes from 3'-0" x 6'-0" to 10'-0" x 20'-0".



APRON FEEDERS

These are heavy duty feeders recommended for use with all types of crushers. Heavy, cast steel, over-lapping aprons and side flanges present a solid surface that resists the impact of large lumps and minimizes sifting. Aprons are supported full width by large rollers mounted in rigid frames of steel beams. Built in widths of 30" to 84" in any length required.

Write for Bulletin #2114.



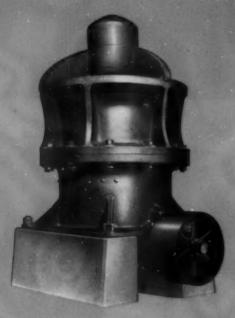
The TC Bulldog is the most advanced primary gyratory crusher available. It em-bodies the improvements of design and manufacture found desirable by Traylor engineers during more than fifty years of experience. Great efficiency and capacity are assured by its sturdiness of design which provides mass for shock absorption; a nonweaving, straightline, bar type spider; an extra short main shaft of maximum diameter and strength; and a long, large diameter eccentric which reduces bearing pressure to the mini-mum. Detailed descriptions and diagrams are contained in Bulletin #126.



TYPE TC CRUSHER SPECIFICATIONS

Opening	. Shipping reight sends	of Each paiving sorling				S WE	GHIN	G 100	TONS LBS. F SHED.	ER C				p.M.	simum agosser suired
Sir	154	350		DISC	HAR	BE OF	PENIN	G-CL	OSED	SIDE	-INC	HES		불교	F F
	~		134	2	2)4	3	31/2	4	8	6	7	8	9		
20 30 36 42 48 54 80	164,000 175,000 255,000 385,000 520,000 600,000 950,000	20" x 80" 30" x 118" 38" x 136" 42" x 153" 48" x 166" 54" x 190" 90" x 210"	105	203 309	250 386 463	310 465 645 645	362 540 650 750	410 618 740 860 990	930 1008 1240 1400	1100 1290 1480 1000 1900	1730 1960 2220	1980 2240 2540	2860	330 320 360 360 325 325 265	150 225 250 275 350 400 490

GYRATORY CRUSHERS



This is a compact machine, requiring little floor space and head room. Its simple design incorporates maximum strength, great efficiency and easy maintenance in features like these—an all cast steel frame, with upper shell and spider made in one piece; self-tightening bell head and curved concaves; an all around bottom discharge without diaphragm and a self-contained countershaft bearing fitted with roller bearings. Specifications and description will be found in Bulletin #7112.

TYPE TY CRUSHER SPECIFICATIONS

E S	guing (s		API	PRO									CUI										RIA	LS		13
11:	(Inche						D	SCF	IAR	GE	OPE	NIE	VG-	CL	OSE	D S	IDE	-19	VCH	ES						P.M.
Z O O	2	1/6	%	14	%	34	34	1/2	96	34	36	1	134	134	136	134	156	134	136	2	21/6	21/4	216	3	334	26.5
1'-3"	3	4	5	6	7	8																				1000
1'-8"	41/2			10	12	14			25	30																865
2'-4"	51/2					47 39	50	53 45 56	58 50 62	63 55 68	59 73	63		69 85	88	91										865
3'-0"	7					1	67 50	74 92 57 82	63	69	74	96 117 79	122 83 117	128	89	92		141				Ī				695
4'-0"	10						115			180	190 112	200 120	170 210 128 158	135												576
5'-6"	13											270	292 350	378	406	430	456 5 280	482	505	530 325	558 340		380 456			490

CRUSHING ROLLS

TYPE A

Designed for light duty, these rolls have tension springs to provide pressures on the rolls up to 5,500 lbs. per lineal inch of roll face. The frames are of Meehanite* metal with spring seats, fixed shaft bearings and lower half of housing cast integral. Provision is made for thrust and lateral adjustment. Renewable smooth-face forged steel tires or one-piece rolls with corrugated faces can be had as special equipment.

TYPE AA

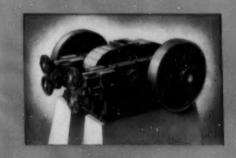
Similar to Type A except that bearings are bored to receive renewable Meehanite* metal babbitted half bushings. Construction is much heavier throughout and pressures up to 25,000 lbs. per lineal inch of roll face are attained.

4 TENSION ROD TYPE

An extra heavy duty machine of unusually massive proportions. The lower half of the housing, tension spring seats and fixed shaft bearing pedestals are cast integral of Meehanite* metal. Lateral and thrust adjustment of the rolls is provided by a simple, sturdy device. Pressures up to 30,000 lbs. per lineal inch of roll face are attained.

Bulletin #5637 describes all of these Crushing Rolls.

*T.M. Reg. U.S. Pat. Off.

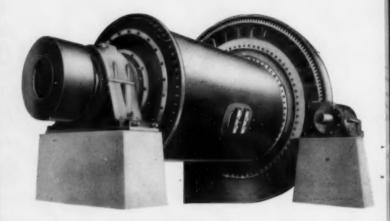


Traylor

MACHINERY FOR THE MINING INDUSTRY

ROTARY KILAS. For over 40 years, Traylor Kilns have been widely used for calcining, roasting and chloridizing, volatilizing, sintering and nodulizing. The universal regard for Traylor Rotary Kilns has been earned by the high efficiency and rugged endurance built into them. The shells are made of thick steel plates welded together. Alignment is readily maintained by easily adjustable supports selected as the most suitable for the particular case. Each system of support includes adequate provision for thrust. Full floating type riding rings, attached to the shells without bolts or rivets, are turned true and smoothly faced. Steel main gears and pinions are generated to a special design in Traylor shops. Both sides of the main gear teeth are faced for extra wear. Another important feature is the individual consideration given to each installation. Every kiln is especially made to fit the job it must do... Sizes have been made to 12'-0" diameter, 450'-0" long. More details are contained in Bulletin 1115.

BALL MILLS. Traylor Ball Mills are made in two general types—overflow and diaphragm discharge. They are designed and built to be used for either wet or dry grinding. Shells are of steel plate, automatically welded for thorough penetration and even flow of welding rod. The table on the opposite page lists sizes for a great majority of applications. Should your process need a different size Traylor is equipped to make any type of grinding mill in any size you may require. With suitable feeders and auxiliary equipment they can be used in closed circuit operation.



These TRAYLOR Features Assure

SHELLS and TRUNNIONS

The shells are of all welded heavy steel plate construction.

The heads are made of cast steel and the trunnions are cast integrally with the detachable heads.

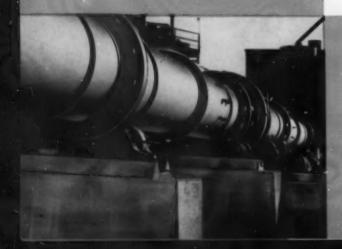
LINERS

The shell liners can be furnished in various types, made of either chilled Mechanite* metal, Lorain high carbon rolled steel, manganese steel or high carbon cast steel. All liners are made in sections of reasonable weight. The

end or head liners are made of alloy steel to resist wear.

DRIVING GEAR

Standard equipment is a steel cut spur gear and a steel pinion. These gears are precision cut on our Mang gear generator, with high addendum in the pinion and low addendum in the gears. The gear is made in halves, bolted together and faced and shouldered on both sides so that it may be reversed. The pinion is mounted on a symmetrical shaft so that it too may be reversed.



ROD MILLS. The rod mill is a medium fine grinder of high efficiency. It is a single compartment mill in which the grinding charge is composed of round steel bars or rods of a length slightly less than the inside length of the mill. The rod mill is not an all-purpose grinder. It is only efficient for coarse or medium coarse work. It is not economical for fine grinding but within its field it has several marked advantages.

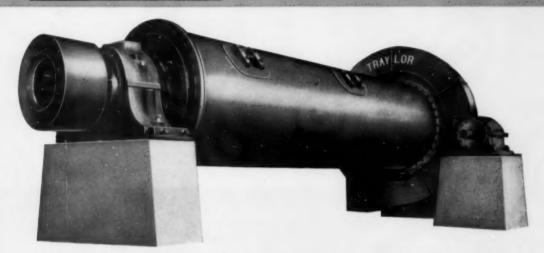
TRAYLOR BALL MILL DATA

Size o Mili in Fe		LP.M.	P. Bloom	Aso		Capac no of Size	2 FE	M M
Dia. IL	gh.		IE	-	20	30	40	109
3 3 3 3 4 4 4 4 4 4 5 5 8 8 7 7 7 8	243486866687878	20 20 20 20 20 20 20 20 20 20 20 20 20 2	15 20 25 40 50 60 75 100 125 125 200 250 250	30 40 30 51 62 63 124 140 185 200 510 930 1000 1100 1320	22 32 30 30 64 76 96 114 143 102 300 400 676 780 677 1000	19 28 28 33 86 66 66 67 110 127 170 265 265 670 706 665	15 20 10 24 36 44 46 64 78 98 140 200 270 465 620 586 780	8 8 11 19 22 25 20 27 80 80 10 22 20 20 20 20 20 20 20 20 20 20 20 20

COMPARTMENT MILLS. This is a ma-

chine combining coarse and fine grinding in one unit. It increases grinding efficiency and makes plant design easier. Traylor Compartment Mills are made with two, three or four compartments, separated by partitions or diaphragms with suitably slotted grates, depending upon the size of feed and the product wanted.

The grinding media are usually metal balls of larger and smaller sizes in the several compartments, respectively, depending upon the kind of product desired. Liners in the several compartments are of metal.



Low-Cost, Dependable Grinding Mill Operation

DRIVES

Traylor Grinding Mills may be driven by either of four types of drive. Flat or V-belt, direct-connected with the motor or through a speed reducer.

MAIN BEARINGS

Made of Mechanite* metal, each fitted with a high pressure Alemite pump. This pump coats the trunnion with a film of grease which lifts and floats the mill to overcome high starting torques and eliminate undue wear caused by "dry" starting.

MANHOLES

These are oval-shaped to permit any of the inside parts of the mill to be passed through. They are reinforced with a heavy steel band or frame welded to the outside of the shell. The manhole plate is held in position by heavy steel crabs and heavy bolts.

FEEDERS

Traylor Mills may be fitted with drum feeders, scoop feeders, a combination drum and scoop feeder, a screw feeder or a spout feeder, all of which discharge directly into the mill. They are made of heavy steel plate, all welded and are secured to the feed end trunnion.

TRAYLOR ROD MILL DATA

Size Mi in Fr		R.P.M.	P. Money	App		o Capac no of Si		24
Dia.	Lgh.				14	30	48	66
3 3 3 ¹ / ₂ 3 ¹ / ₂ 4 4 6 6 7	8 7 8 10 10 12 12 12 16 16	25 20 27 27 26 26 21 21 17 16 13	30 36 30 40 90 100 125 150 175 300	77 98 100 175 200 200 640 625 800 1200 2500	86 80 130 130 215 200 470 540 700 1100 2000	86 95 110 180 180 410 825 889 1200	20 27 27 125 160 27 335 400 400 1000	28 36 66 61 110 286 215 286 786

APRIL 15, 1954

TUBE and PEBBLE MILLS. The tube mill is a single compartment mill with a length to

diameter ratio of about 3:1. Steel or iron balls are used as grinding media. The liners are of metal and designed for the special service in which the mill is to be used.

Pebble mills are also single compartment machines. They are designed for use with grinding media of pebbles, flint, hard rock or other non-metallic material. They are lined with Silex, porcelain or stone to prevent iron adulteration of the product to be ground.

For more information about all types of Traylor Grinding Mills write for Bulletin 3103.



CONVERTERS

For many years, Traylor has supplied the world's leading copper and nickel producers with converters of the Pierce-Smith type in sizes up to 13'-0" dia. x 35'-0" long.

Traylor-made Pierce-Smith Horizontal Converters have plates up to 1¼" thick, with heads of 1" plate heavily reinforced. Riding rings are of cast steel, with main driving gear bolted to one of them. Eight cast steel cradle rollers support the shell. Tuyeres are connected by suitable pipes to the wind box; blast connection is provided with swivel joint.

Tilting is done by two sets of cast steel spur gears direct-connected to driving motor through worm gear reduction or through speed reducer. Shell may be revolved through 360°. Write for additional details.

STONE AND ORE SCRUBBERS

Traylor Scrubbers are revolving cylinders designed to hold the materials long enough to allow agitation in large quantities of water to separate, disintegrate and float off foreign matter. For materials easily cleaned the cylinders are made of perforated metal, either with or without jackets. For more difficult work the ball mill type is employed, with a solid shell and suitable liners designed with large baffles to produce maximum agitation.

Traylor Scrubbers are heavily proportioned to withstand the severe usage incident to handling large tonnages. They are supplied in any size desired. Write for additional details.

TRAYLOR ENGINEERING & MANUFACTURING COMPANY . Allentown, Pa.

District Offices: NEW YORK CITY, NEW YORK CHICAGO, ILLINOIS SAN FRANCISCO, CAL.

3416 Empire State Bldg. 2051 One LaSalle St. Bldg. 55 New Montgomery St.

Canadian Manufacturer: CANADIAN VICKERS, LTD., MONTREAL, QUE, CANADA



CASTING MACHINES

Traylor builds two types of casting machines—Straight Line and Circular—of which the latter is more popular. The Traylor Circular Anode Casting Machine is very heavily proportioned, driven by two motors through separate gear trains but with a single control, and is designed to run in either direction. The track is conical, and the turn-table supporting the mold platform runs on flanged conical rollers. Sizes up to 40'-0" have been built. Write for additional details.

SMELTING FURNACES

Traylor Copper and Lead Blast Furnaces are supplied, in the circular type, in sizes from 30" to 48" dia. and in the rectangular type up to 56" x 360". Any capacity of rectangular furnace can be built, based on an extreme width at the tuyeres of 56" for copper and 48" for lead.

SMELTING ACCESSORIES

Every variety furnished including Bales, Blast Valves, Bullion Molds, Converter Slings, Copper Molds, Crucibles, Forehearths, Ingot Molds, Ladles, Ladle Tilting Mechanisms, Lead Coolers, Lead Kettles, Lead Molds, Matte Cars, Matte Molds, Matte Settlers and Slag Pots.

STANDARDIZED PRODUCTS by



SERVE THROUGHOUT THE MINING INDUSTRY

Decause of their outstanding service records on heavy duty operations under severe conditions, FALK dependable power transmission products have corned the confidence of the MINING INDUSTRY on such typical applications as . . . Agitaters

* Ball Mills * Blowers * Bucket Elevators * Car Dumpors * Classifiers * Compressors * Conveyors * Crushers * Filters * Plotation Colis * Hammermills * Noists * Kilns * Mine Cars * Pobble Mills * Pulverizers * Pumpe * Red Mills * Retary Dryors * Slurry Mixers * Thickeners



Motoreducer All-Motor Horizontal



Motoreducer Integral Horizontal



Motoreducer Integral Vertical



Motoreducer All-Motor Right Angle



Speed Reducer Concentric Shaft



Speed Reducer Small Right Angle



Speed Reducer Large Parallel Shaft



Speed Reducer—Large Right Angle Horizontal



Speed Reducer—Larg Right Angle Vertical



High Speed Gear Drives, Reducers or Increasers



Special Gear Drives for Any Application



Shaft Mounted Drives



Steelflex Couplings Standard or Dual Purpose



Airflex Couplings—For High Torque Fluctuations



Helical Gears—Any Size



Large Steelflex Couplings for Heavy Duty Service



Marine Propulsion Gears,



Steel Castings Up To 80,000 Pounds



Steel Weldments—In Any Size, Design, or Quantity

FALK PRECISION POWER TRANSMISSION EQUIPMENT ENGINEERED FOR TROUBLE-FREE PERFORMANCE...

For more than half a century, The Falk Corporation has manufactured precision made power transmission products which have served successfully in almost every industry, throughout the world. During this period of time, Falk developed and introduced many engineering improvements which have established recognized standards of design and performance for modern helical gearing.

These Falk innovations and advancements can be attributed to an aggressive, modern attitude on the part of Faik management, motivated by a desire to design and manufacture products which will last longer, operate more officiently, require less maintenance, and reduce cests. The

name Falk symbolizes ceaseless metallurgical and technical research . . . advanced engineering, designing, and production techniques . . . and a constant desire to give better service to buyers and users of Falk areducts.

Within the continental United States, Paik service is readily available. Experienced Falk Representatives in 44 principal cities and Authorized Falk Distributers in more than 100 cities will welcome the opportunity to work with you in solving your power transmission problems. Delivery to suit your requirement is assured by the Falk policy of maintaining large factory, field, and distributer stacks. For quality products and prompt service, it pays to sensuit Falk.

FALK

... a good name in industry

BULLETIN 20,000 - 1954

ALK HANDY FLOW CHART FOR SELECTION OF REDUCERS

- A. From Column A, determine type of prime mover.

 1. Motor and reducer...packaged assembly.

 2. Motor or engine connected to reducer with a coupling, V-belt, or chain.
 - 3. Turbine, motor, or engine coupled to goor unit used
- B. Select position of reducer output shalt relative to reducer input shalt. Note Figure Number.

 C. Check Power Path and range of horsepower, rpm, and ratio for Figure Number selected. For ratings beyond those shown in "C", Falk may offer a modified standard a result of the County Falk.

A			3					C				Falk Standard Gear Reducers
Type			Output		Figure N	POWER	PATH	Approx.	Approx.	Ratio	Ronge	Standard Falk reducers are carried in stock in a wide range of sizes and ratios.
Prime Mover	-		Hor.		Fig	PLAN VIEW	ELEVATION	Range	Max. RPM	Min.	Mex.	stock in a wide range of sizes and rands.
	•				1		Side	1 10 75	1750	3.3	970	Motoreducers Twe designs, both permitting use of any make of mo- tor. The All-
1. motor			•		2		End C	1 10 75	1750	5.0	1450	In-Line Horizontal Meter fer any feet mounted mater. The Integral for any NEMA D flange meter.
only				•	3			1 10 75	1750	5.0	1450	2. Right Angle Horizontal
		Vert.			4	0	Side	1 10 75	1750	3.3	970	3. Right Angle Vertical 4. In-Line Vertical
	•				5	1	Side	1 10 150	1750	1.5	970	Speed Reducers — Falk precision cut gears, helical or spiral bevel. Any output shaft position. Efficiencies from 96% to 98½%. Sturdy housings, liberal bearing capacities, and reliable lubrication.
	•				6		Side	15 10 3000	1750	2.2	300	
2. motor			•		7	1	End Gio	1 10 200	1750	5.0	1450	5. Concentric Shaft 6. Large Parallel Shaft
engine			•		8		Side	15 10 1000	1750	1.5	515	7. Small Right Angle 8. Large Right Angle
				•	9	1		1 10 200	1750	5.0	1450	Harizontal Harizontal
				•	10			15 10 700	1750	5.7	430	9. Small Right Angle 10. Large Right Angle Vertical
	•				11		Side	3 10 225	4500	1.5	25.4	High Speed Drives For use as reducers or increasers. Quiet opera- tion, high efficiency. For speeds beyond those
3. turbine motor	•				12		5140	125 10 5000	9000	1.0	12.0	listed, consult Factory.
or engine			•		13	H	End Com	3 10 200	4500	5.0	1450	12. High Speed 13. Semi-High Speed

FALSE HANDY SELECTION for Reducers and Couplings

To select gears, gear units, or couplings, it is necessary to have the following information:

- T. (a) Type of prime mover.
- 2. (a) HP of prime mover.
- 3. (a) RPM of prime mover.
- (b) Type of driven machine.
- (b) HP of driven machine.
- (b) RPM of driven machine. 4. Number of hours per day equipment is to operate.
- 5. Figure Number Refer to Figures 1 to 73 on apposite page or to Figures 14 through 19 shown below.

On any inquiry, please furnish the above intermution, or use Handy Reply Card to the right.

14



Shaft Mounted Drives - Mount on shaft of driven machine . . . with V-belt connection to motor. All steel construction . . . precision gearing . . . positive lubrication . . . sealed housings. Single and double reduction units to provide output speeds ranging from 420 to 14 rpm. In six sizes, from $\frac{1}{2}$ through 30 hp. AGMA ratings.



For 9 out of 10 industrial applications.

Steelflex Couplings - Single Purpose couplings designed primarily for connecting shafts on standard or unusual applications . . . or Dual Purpose couplings which serve both to connect shafts and to provide other functions.

Single Purpose for

- (a) General applications
- (b) Restricted space
- (c) Short shaft extensions
- (d) High speeds

Dual Purpose for

- (e) Reversing service
- (f) Long or floating shafts
- (g) Brakewheel service
- (h) Overload protection



Standard Type

Airflex Couplings - Designed to protect mechinery from impacts resulting from irregular torque characteristics of prime mover or driven machine. Standard type for most applications. Dual purpose types for problem applications,

Standard Type

(a) For general use

Dual Purpose Types

- (b) To transmit thrust
- (c) For floating shaft
- (d) For severe service

17. 18.

Helical or Herringbone Gears - For any application. Hub gears — solid or split hubs, solid or split rims. Ring gears — solid or split rims. Mill pinions. Precision cut, Falk-improved tooth form. Face widths up to 6 feet. Diameters up to 18 feet. Gears made of Falk alloy steels, pinions of steel forgings. Full load efficiency of 98% per train. AGMA ratings.

Helical Herringbone



Special

Special Drives-folk has the engineering experience and complete production facilities to design and produce gear drives of any type, from super high speed drives for aeronautical laboratories . . . to sturdy, slow speed steel mill drives.

Other Products

Marine **Propulsion Drives**

Steel Castings

Weldments

Contract Machining

Attention: Falk Corporation

Engineering Dept. No. 255

Please send literature describing: Motoreducers Shaft Mounted Drives Speed Reducers Couplings I am interested in receiving a quotation for the following application: 1. Type of: (a) Prime mover..... (b) Driven machine 2. Horsepower: (a) Prime mover..... (b) Driven machine 3. RPM: (a) Prime mover...... (b) Driven machine 4. Number of hours service per day 5. Figure Number (See Figures Number 1 through 19, shown to left.) Name Position or Dept.... Company Address City and State



Attention:	Palk	corb	orat	ion
	Engine	erina	Dept.	No.

Please send literature describing:

Motoreducers	Shaft Mounted	Drives
Speed Reducers	Couplings	

I am interested in receiving a quotation for the following application:

- 1. Type of: (a) Prime mover.....
 - (b) Driven machine

255

- 2. Horsepower: (a) Prime mover......
 - (b) Driven machine
- 3. RPM: (a) Prime mover......
 - (b) Driven machine
- 4. Number of hours
- service per day

5. Figure Number (See Figures Number 1 through 19,

shown to left.)

Position or Dept....

Company

Address City and State

USINESS

REPLY

4c POSTAGE WILL BE PAID BY -CARD

THE FALK CORPORATION

Milwaukee, Wisconsii (Sec. 34.9, P.L.&R.) PERMIT NO. 4401 FIRST CLASS

3004 W. CANAL STREET - Dept. No. 255-4 MILWAUKEE 8, WISCONSIN

.a good name in industry

BUSINESS

REPLY CARD

4c POSTAGE WILL BE PAID BY -

3004 W. CANAL STREET - Dept. No. 255-4 THE FALK CORPORATION

MILWAUKEE 8, WISCONSIN

Milwoukee, Wisconsin

(Sec. 34.9, P.L.&R.) PERMIT NO. 4401 FIRST CLASS



THE FALK CORPORATION - MILWAUKEE, WISCORSIN DISTRICT OFFICES AND REPRESENTATIVES

ARION Y, OHIQ	W. Rogers Co	850 So. High St.
Albany 7, N. Y	F. A. Stahl	75 State St.
Atlanta 1, Ga	W. F. Hardcastle	609 Walton Bldg.
Baltimere 18, Md	G. J. Sturmfelsz	. 1206 Southview Rd.
Regument, Texas	Brance-Krachy Co	2014 Pock
Sirmingham 1. Ala	General Mochy, Co	1600 Second Ave. Se
Beston Mass	J. W. FitzGerald	433 Managharata Aug
		Arlington 74, Mass.
Bulliata 9 N V	H. M. Knouth	Arrington 74, mass.
Charleston 1 W Vo	W. J. Hess	401 McEntey Bldg.
Chicago 2 III	W. J. 11050	JUZ Morrison Bidg.
Chicago 3, III	C. H. Thomas	122 S. Michigan Ave.
Cincinnati 2, Onts	K. W. Morrissey	609 American Bldg.
Cleveland 15, Ohio	P. M. Kline & Assoc	2036 East 22nd St.
Corpus Christi, Tox	Brance-Krachy Co	643 N. Port Ave.
Dallas S, Texas	R. L. Middleton	3500 Princeton
Dayton 2, Ohio,	H. H. Nuernberg	410 West 1st St.
Denver 3, Colorado	H. H. Klackner	916 Broadway
Detroit 26, Mich	L. B. DeGatan	2301 Dime Bldg.
Fairmont, W. Va	C. M. Sincell	801 Coleman Ave.
Grand Rapids 2, Mich.	M. J. Sandling	. 518 Warray Bida
Hartford, Conn	Kenneth F. Thomas Co	62 La Salla Boad
		West Hartford 7
Mouston 1 Towns	Brance-Krachy Co	
Indianapolis 20 Ind	P. W. Huddlestun	
Manage City & Ma		JANG GUILLOID AVE.
Kensas City 8, Mo	B. L. McCreary & Son	1819 Central St.
Kensas City 8, Mo Knoxville 17, Tenn	B. L. McCreary & SonBowditch & Co	1819 Central St. 1311-C N. Broadway
Kensas City 8, Mo Knoxville 17, Tenn	B. L. McCreary & Son	1819 Central St. 1311-C N. Broadway 220 W. Broadway,
Kensas City 8, Mo Knoxville 17, Yenn Les Angeles, Calif	B. L. McCreary & SonBowditch & CoR. E. Forsland	1819 Centrol St. 1311-C N. Broadway 220 W. Broadway,
Kensas City 8, Mo Knoxville 17, Tenn Les Angeles, Calif Milwaukee 8, Wis	B. L. McCreary & Son Bowditch & Co E. E. Forsland L. H. Billing	1819 Central St. 1311-C N. Broadway 220 W. Broadway, Glendale 4 3001 W. Canal St.
Kenses City 8, Me Knexville 17, Tenn Les Angeles, Celif Milweukee 6, Wis Minneapolis 15, Minn	B. L. McCreary & Son Bowdirch & Co E. E. Forsland L. H. Billing H. R. Harris	1819 Central \$11311-C N. Broadway220 W. Broadway, Glendale 43001 W. Cunal \$t708 Portland Ave.
Kensas City 8, Mo Knaxville 17, Tenn Lee Angoles, Calif Milwaukee 6, Wis Minneapolis 15, Minn Nowark 5, N. J	B. L. McCreary & Son Bowditch & Co E. E. Forslund L. H. Billing H. R. Harris R. A. Kelling	1819 Central St. 1311-C N. Broadway 220 W. Broadway, Glendale 4 3001 W. Cunal St. 708 Porlland Ave. 100 Porkhyest St.
Kensas City 8, Mo Knaxville 17, Tenn Les Angeles, Calif Milwaukee 8, Wis Minneapolis 13, Minn Newark 5, N. J New Orleans 13, Le	B. L. McCreary & Son Bowditch & Co E. E. Forsland L. H. Billing H. R. Harris R. A. Kelting Robbins & Robbins	1819 Central St1311-C N. Broadway220 W. Broadway Glendale 43001 W. Canal St708 Portland Ave100 Parkhurst St.
Kensas City 8, Mo Knaxville 17, Tenn Les Angeles, Calif Milwaukee 8, Wis Minneapolis 13, Minn Newark 5, N. J New Orleans 13, Le	B. L. McCreary & Son Bowditch & Co E. E. Forsland L. H. Billing H. R. Harris R. A. Kelting Robbins & Robbins	1819 Central St1311-C N. Broadway220 W. Broadway Glendale 43001 W. Canal St708 Portland Ave100 Parkhurst St.
Kensas City 8, Mo	B. L. McCreary & Son Bowditch & Co E. E. Forslund L. H. Bitling H. R. Harris R. A. Kelling Robbins & Robbins W. J. Urben E. W. Werth	1819 Central St1311-C N. Broadway220 W. Broadway, Glendale 43001 W. Canal St708 Portland Ave100 Parkhurst St1037 Magazine St50 Church St. 610 16th Street
Kensas City 8, Mo	B. L. McCreary & Son Bowditch & Co E. E. Forslund L. H. Bitling H. R. Harris R. A. Kelling Robbins & Robbins W. J. Urben E. W. Werth	1819 Central St1311-C N. Broadway220 W. Broadway, Glendale 43001 W. Canal St708 Portland Ave100 Parkhurst St1037 Magazine St50 Church St. 610 16th Street
Kensas City 8, Mo Knaxville 17, Tenn Lee Angoles, Calif Milwaukee 8, Wis Minneapolis 15, Minn Newark 5, N. J New Orleans 13, Le New York 7, N. Y Oakland, Calif. Paoria, Ill.	B. L. McCreary & Son Bowditch & Co E. E. Forsland L. H. Billing H. R. Harris R. A. Kelling Robbins & Robbins W. J. Urben R. W. Werth P. J. Hagerty	1819 Central St1311-C N. Broadway220 W. Broadway, Glendale 43001 W. Cunal St708 Porlland Ave100 Parkhurst St1037 Magazine St50 Church St610 16th Street600 S. Adams St.
Kensas City 8, Mo Knaxville 17, Tenn Lee Angoles, Calif Milwaukee 8, Wis Minneapelis 15, Minn Nowark 3, N. J New Orleans 13, La New York 7, N. Y Oakland, Calif Philadelphia, Pa	B. L. McCreary & Son. Bowditch & Co. E. E. Forslund L. H. Bitting M. R. Harris R. A. Kelting Bobbins & Robbins W. J. Urben R. W. Werth P. J. Hegerty D. S. Ferree	1819 Central St1311-C N. Broadway20 W. Broadway, Glendale 43001 W. Canal St708 Portland Ave100 Parkhurst St1037 Magazine St50 Church St610 16th Street800 S. Adams St205 Long Lane,
Kensas City 8, Mo Knaxville 17, Tenn Lee Angoles, Calif Milwaukee 8, Wis Minneapelis 15, Minn Nowark 3, N. J New Orleans 13, La New York 7, N. Y Oakland, Calif Philadelphia, Pa	B. L. McCreary & Son. Bowditch & Co. E. E. Forslund L. H. Bitting M. R. Harris R. A. Kelting Bobbins & Robbins W. J. Urben R. W. Werth P. J. Hegerty D. S. Ferree	1819 Central St1311-C N. Broadway20 W. Broadway, Glendale 43001 W. Canal St708 Portland Ave100 Parkhurst St1037 Magazine St50 Church St610 16th Street800 S. Adams St205 Long Lane,
Kensas City 8, Mo Knaxville 17, Tenn Lee Angoles, Calif Milwaukee 8, Wis Minneapelis 15, Minn Nowark 5, N. J New Orleans 13, Le New York 7, N. Y Oakland, Calif. Peoria, Ill Philadelphia, Pe	B. L. McCreary & Son Bowditch & Co E. E. Forslund L. H. Bitling H. R. Harris R. A. Keiting Robbins & Robbins W. J. Urben R. W. Warth P. J. Hegerly D. S. Ferree D. Adoms	1819 Central St1311-C N. Broadway20 W. Broadway, Glendale 43001 W. Canal St708 Portland Ave100 Parkhurst St1037 Magazine St50 Church St610 16th Street800 S. Adams St205 Lang Lane, Upper Darby410 Grant Bidg.
Kensas City B, Mo Knozville 17, Tenn Les Angeles, Celif Milwaukee B, Wis Minneapolis 15, Minn New Orleans 13, Le New Yerk 7, N. Y Oakland, Calif Phoria, Ill Philadelphia, Pa Pirisburgh 10, Pa Portland 14, Orean.	B. L. McCreary & Son. Bowditch & Co. E. E. Forslund L. H. Billing H. R. Harris R. A. Kelting Robbins & Robbins W. J. Urben R. W. Warth P. J. Hagerty D. S. Ferree D. Adems Wassern Marky Core	
Kensas City 8, Mo Knaxville 17, Tenn Les Angeles, Celif Milwaukee 8, Wis Minneapelis 15, Minn Newark 5, N. J New Orleans 12, Le New Yerk 7, N. Y Oakland, Calif Peoria, Ill Philadelphia, Pe Pirisburgh 10, Pa Pertland 14, Oregen Richmend 19, Va	B. L. MicCrary & Son. Bowditch & Co. E. E. Forslund L. H. Billing H. R. Harris R. A. Kelting Robbins & Robbins W. J. Urben R. W. Warth P. J. Hagarty D. S. Ferree D. Adams Wastern Machy. Corp. Williamson & Wilmer, Inc.	
Kensas City 8, Mo Knaxville 17, Tenn Lee Angoles, Calif Milwaukee 8, Wis Minneapelis 15, Minn Nowark 3, N. J New Orleans 13, Le New York 7, N. Y Oakland, Calif Philadelphia, Pa Pirisburgh 10, Pa Periland 14, Oregan Richmond 19, Va Rechester 4, N. Y	B. L. McCreary & Son. Bowditch & Co. E. E. Forslund L. H. Billing M. R. Harris R. A. Kelling Bobbins & Robbins W. J. Urben R. W. Warth P. J. Hegerly D. S. Ferree D. Adoms Wessern Machy, Corp. Williamson & Williamer, Inc. R. G. Burns	1819 Central St1311-C N. Broadway20 W. Broadway,
Kansas City S, Mo. Knozville 17, Tenn. Les Angeles, Calif Milwaukee S, Wis. Minneapolis 15, Minn. Newark 5, N. J. New Orleans 13, Le. New Yerk 7, N. Y. Oakland, Calif. Peoria, III. Philadelphia, Pa. Prilaburgh 10, Pa. Porlland 14, Oregon. Richnond 19, Va. Rechester 4, N. Y. St. Louis 5, Mo.	B. L. McCreary & Son. Bowditch & Co. L. E. Forsland L. H. Billing. H. R. Harris R. A. Kelling. Robbins & Robbins W. J. Urben R. W. Warth P. J. Hagariy D. S. Ferree D. Adoms Wessern Machy. Corp. Williamson & Wilmer, Inc. R. G. Burns P. F. Mulkey	
Kensas City B, Mo Knozville 17, Tenn Les Angeles, Celif Milwaukee B, Wis Minneapolis 15, Minn New Crieane 13, Le New Yerk 7, N. Y Oakland, Cailf. Peoria, Ill Philadelphia, Pe Pirisburgh 1C, Pa Periland 14, Oregan Richmand 19, Va Rechester 4, N. Y St. Louis S, Mo Ian Francisco S, Celif	B. L. MicCrary & Son. Bowditch & Co. E. E. Forslund L. H. Billing H. R. Harris R. A. Kelting Robbins & Robbins W. J. Urben R. W. Warth P. J. Hagerly D. S. Ferree D. Adems Wassern Machy. Cerp. Williamson & Wilmer, Inc. R. G. Burns P. F. Mulkey Transmission Engrg. Co.	. 1819 Central St 1311-C N. Braadway . 220 W. Braadway, . Glendale 4 . 3001 W. Canal St 708 Partland Ave 100 Parkhurst St 1037 Magazine St 500 Church St 610 16th Street . 800 S. Adoms St 205 Long Lane, . Upper Darby . 410 Grant Bidg 1035 S. E. 9th Ave 617 Mutual Bidg 241 East Ave 8029 Forsyth Bivd 53 Stevenson St.
Kensas City 8, Mo Knaxville 17, Tenn Lee Angoles, Calif Millwaukee 8, Wis Minneapelis 15, Minn Nowark 5, N. J New Orleans 13, Le New York 7, N. Y Oakland, Calif Philadelphia, Pa Pirisburgh 10, Pa Portland 14, Oregan Richmond 19, Va Rachester 4, N. Y St. Louis 5, Me Jan Francisco 5, Calif Seattle 9, Wash.	B. L. McCreary & Son. Bowditch & Co. E. E. Forslund L. H. Billing M. R. Harris R. A. Kelling Bobbins & Robbins W. J. Urban R. W. Warth P. J. Hagariy D. S. Forree D. Adams Wessern Machy, Corp. Williamson & Wilmer, Inc. R. G. Burns P. F. Mulkey Transmission Engrg, Co. Arthur T. Harris	
Kensas City 8, Mo. Knoxville 17, Tenn. Lee Angoles, Calif Milwaukee 8, Wis. Minneapelis 15, Minn. Nowark 5, N. J. New Orleans 13, Le. New York 7, N. Y. Oakland, Calif. Peoria, Ill. Philadelphia, Pa. Pirisburgh 10, Pa. Perriand 14, Oregan. Richmend 19, Va. St. Louis 5, Mo. San Francisco 5, Calif. Seattle 9, Wash. Synause 3, N. Y.	B. L. McCreary & Son. Bowditch & Co. E. E. Forslund L. H. Bitling H. R. Harris R. A. Kelting Robbins & Robbins W. J. Urben R. W. Werth P. J. Hegerly D. S. Ferree D. Adoms Wassern Machy. Cerp. Williamson & Wilmer, Inc. R. G. Burns P. F. Mulkey Transmission Engrg. Co. Arthur T. Horris P. O. Sailer	
Kensas City B, Mo. Knozville 17, Tenn. Les Angeles, Celif. Milwaukee B, Wis. Minneapolis 15, Minn. New Crieane 13, Le. New Yerk 7, N. Y. Oakland, Calif. Peoria, Ill. Philadelphia, Pe. Pirisburgh 10, Pa. Perland 14, Oregan. Richmend 19, Va. Rechester 4, N. Y. St. Louis S, Mo. Jan Francisco S, Celif. Seattle 9, Wash. Syracuse 3, N. Y. Tuisa 3, Otte.	B. L. McCreary & Son. Bowditch & Co. E. E. Forslund L. H. Billing M. R. Harris R. A. Kelling Bobbins & Robbins W. J. Urban R. W. Warth P. J. Hagariy D. S. Forree D. Adams Wessern Machy, Corp. Williamson & Wilmer, Inc. R. G. Burns P. F. Mulkey Transmission Engrg, Co. Arthur T. Harris	. 1819 Central St 1311-C N. Braadway . 220 W. Braadway, . Glendale 4 . 3001 W. Canal St 708 Partland Ave 100 Parkhurst St 1037 Magazine St 500 Church St 610 16th Street . 800 S. Adoms St 205 Long Lane, . Upper Darby . 410 Grant Bidg 1035 S. E. 9th Ave 8029 Forsyth Bivd 53 Stevenson St 1500 Westlake North . 803 S. Salina St Petroleum Bidg.

BrazilWilliam G. Wieslew, Sao Poula
Conode Wm. Kennedy & Sons, Ltd., Owen Sound, Ontorio
Canada
Chile James M. Carr y Cia., S.A.C., Santiago
Cuba Cuba Ragra. Corp., Havana 1 (Vedado)
Hawaii
Moulco
Mexice
Philippine Islands Fornshows Docks & Manalulu Iron Why Manile
Puerte Rice
South Africa E. L. Bateman, Ltd., Johannesburg
Philippine Islands

... a good name in industry

PAGE 280

MINING WORLD

THE DEISTER CONCENTRATOR COMPANY



The Original Deister Company-Incorporated 1906

Manufacturers of Vibrating Screens, Ore Concentrating and Material Washing Tables 929 Glasgow Avenue, Fort Wayne, Ind.



Export Sales 7 Hanover Square, New York, N. Y.
Pennsylvania Sales 35 E. Center St., Nesquehoning, Pa.
Alabama Sales 2612 North 24th St., Birmingham, Ala.
Consolidated Supply Co. Picher, Oklahoma

Drilling & Mining Equipment Co., 2020 Sacramento St., Los Angeles, Cal. Adelman Machinery Co., 520 First Ave. South, Seattle, Washington Mussens, Ltd., Toronto and Montreal, Canada International Agencies & Mchy. Co., Vancouver, B. C.

OVER 40 YEARS EXCLUSIVELY ENGAGED IN THE MANUFACTURE OF SEPARATING AND SIZING EQUIPMENT

Super Duty DIAGONAL-DECK CONCENTRATING TABLES



Diagonal-Deck Tables

Diagonal-Deck Deister-Overstrom Concentrating Tables have been accepted as the standard the world over for more than a quarter of a century. Leading this line of outstanding and time proven tables is the new SuperDuty DIAGONAL-DECK TABLE, now firmly established by substantial commercial applications as the most advanced in features, performance and practical advantages.

THE Super Duty TABLE

- OFFERS HIGHER CAPACITY—Small middling loads, a direct result of the Diagonal-Deck, plus greater efficiency of Concence Head Motion means more tons of new feed handled per day per table.
- •SURPASSES IN RECOVERY any other concentrating table built while maintaining comparable or higher feed and product capacity.
- MAKES HIGHER GRADE PRODUCTS because "fanning out" action of the Diagonal-Deck permits more accurate cutting of tion of the product yield.
- YIELDS THE GREATEST PROFIT by its overall efficiency in performance and matchless operating economy.
- REQUIRES ONLY 2 H.P. Motor on the No. 6 Ore Table for starting and substantially ½ H.P. under continuous operation. The No. 7 Coal Washing Table requires only a 3 H.P. motor to start and substantially 1 H.P. under continuous operation.
- OFFERS A RECORD MAKING HEAD MOTION. The Concence Anti-Friction Head Motion is a modern, efficient mechanism far ahead of the field. First in application of anti-friction bearings, its leadership has been maintained over two decades. Outstanding performance is fully verified through field-wide acceptance.
- IS THE SMOOTHEST AND EASIEST RUNNING table ever built, by virtue of its sturdy balanced supports, deck eperating design and outstanding head motion.
- 'S A COMPLETE MACHINE—embracing more than just a head motion, deck and a few slide bearing units requiring the addi-tion of adequate frame and support elements te build into a finished and properly aligned machine, completed at user's full responsibility and extra expense.
- *CANNOT BE EQUALED FOR LOW COSTS in operation and main-
- IS DEFINITELY OUT IN FRONT as your best, safest and most profitable choice considering both your investment and operating

SuperOuly Diagonal-Deck Ore Tables

Minerals-Metallic-For the recovery of mineral values from gangue, for the differential separation of complex minerals, Diagonal-Deck Deister-Overstrom Tables long proved their value. A logical development from these sturdy forerunners, the Super-Duty Diagonal-Deck Concentrating Table is today proving itself the most highly developed and successful wet gravity concentrating apparatus in the world's leading mills. Used ahead of flotation, these tables effectively eliminate barren coarse gangue and reduce the tonnage for fine grinding; relieve the pulp of a large part of the mineral load and lessen the burden on the more intricate flotation process. Following flotation, tables are used to recover the tarnished, oxidized or carbonate mineral particles that are so ineffectively recovered by flotation.

SuperDuty Diagonal-Deck Tables used as pilots in flo-tation guide the operator in regulating the flotation oils and reagents. Pilots are used on concentrates, middlings, intermediate products, tailings and are placed in various parts of the flow-sheet.

On carbonate or oxidized ores especially, these tables have proven the simplest and most economical method of concentration.

Minerals—Non-Metallic—The use of tables on non-metallic minerals is now general. For the separation of silica, feldspar, iron and granular particles from kaolin and in the recovery of mica, garnet, silica, cyanite, barytes, fluorspar, graphite, phosphate, potash, etc., tables have proven their commercial value. SuperDuty Diagonal-Deck Tables are used successfully on the most difficult separations; for example: the differential concentration of barite-iron-silica or garnet-silica-mica.

Recovery of Values from Residues-The residual sands and ashes resulting from operation of brass and other metal foundries have a high metallic content. Formerly this sand was washed by hand and an inefficient recovery made. SuperDuty tables are now used on foundry residue and efficient recovery is made of even the very finest metallics. Copper, brass, tungsten, zinc and many other metals are recovered from waste materials at a substantial profit.

WRITE FOR CATALOGS

Patents on this equipment owned or controlled by The Deister Concentrator Co. Trade-marks registered in U.S. and foreign countries.

Super Duty Diagonal-Deck Coal Washing Tables

The SuperDuty Diagonal-Deck Table cleans either bituminous or anthracite coal. Although most widely used on the sizes finer than %", installations on sizes up to 1½" are eminently successful. Conversely, because of ultra mobility and smoothness of deck operation, effective work mobility and smoothness of deck operation, effective work is now possible on extremely fine sizes—within the minus 48 mesh range. Clean coal is being recovered in many instances from the refuse products of other coal cleaning devices, both with and without recrushing. Another source of table feed is the undersize from dewatering screens which follow other coal cleaning machines. Reject materials forming culm banks, river deposits and waste piles may in many instances be reclaimed. In fact, the SuperDuty table may be used on any cleaning problem where there is a specific gravity difference between relatively free particles of coal and refuse.

Design—SuperDuty Diagonal-Deck Coal Washing Ta-bles are designed for efficient cleaning of coal, especially those sizes which jigs and similar machines fail to handle efficiently and profitably.

Installation—Diagonal-Deck Coal Washing Tables may be installed singly or in battery. Number of tables required is governed by tonnage to be handled. Tables in battery installation operate as independent units, consequently, individual tables may be cut in or out to meet variations in production schedule profitably.

Investment—SuperDuty Diagonal-Deck Coal Washing Tables represent the lowest initial investment regardless of size of installation. These tables meet the requirements for efficient cleaning, low operating costs and production

Operation—This process, employing wet gravity principles, offers the greatest simplicity in operation, while full visibility of separation accounts for the finest results by unskilled attendants.

No other process can equal their performance on sizes 14" to finest dust. High efficiency is attested by their elimination of 90% or better of the free impurities including slate, sulphur, pyrite, shale, fire clay, gravel, bone and tramp iron. Simultaneously loss of coal to refuse is minimized beyond the possibilities of other processes.

Capacities—Depending on type and size of coal, washability and cleaning requirements, capacities of Diagonal-Deck Tables run from 4 to 20 tons per hour.

New Specialized Models—The new Models HCRD and HCCD are specialized designs of the No. 7 and No. 6 sizes, respectively, of the SuperDuty Diagonal-Deck Concentrating Table. In these models, that portion of the deck periphery available for discharging high gravity feed components is doubled, without subtracting from the low-gravity discharge periphery, thereby doubling available high-gravity discharge capacity, with attendant increase in table feed capacity. These models are intended for the high capacity handling of feeds wherein the high-gravity fraction represents a relatively large percentage of the total. Phosphate rock, coal and the ores of iron and chrome provide typical fields for application. For other feeds, wherein the high-gravity fraction represents a relatively small percentage of the total, the well known, regular models of SuperDuty Diagonal-Deck Concentrating Tables are applicable, as in the past.

Concenco Distributors

The Concenco Revolving Feed Dis-The Concence Revolving Feed Distributor, built in six types, is a heavily fabricated, all steel machine with motor drive requiring only % H.P. in operation. The Distributor effects perfectly a splitting of feed sluiced to its revolving tank, into any desired number of equal portions from two to sixteen, in some cases more. It is especially suitable for efficiently feeding any number of circuits or machines in battery for higher overall efficiency. It is unexcelled for feeding concentrations to be suitable or suitable. ing tables.



Concenco CPC Classifiers



Concenco Constriction Plate Classifiers of all steel welded construction are furnished in any number of cells from 2 to 14 to meet requirements. Each cell is square in horizontal cross section and consists of three chambers: the pressure chamber at the bottom; the sorting column immediately above and separated from the pressure chamber by a constriction plate; and the launder section above the sorting column, which is materially increased in cross section to reduce velocity of flow.

Concenco Super Sorter



The Concenco SuperSorter does what engineering opinion The Concence Supersorter does what engineering opinion has heretofore held impossible . . . it sorts granular materials hydraulically into a number of uniform, graded products on a low cost, high tonnage basis. The barriers of the past have been overcome in the Concence glant classifier, which maintains teeter and zone densities hitherto considered impossible in large cell cross-sections needed for handling substantial capacities.

Applications

The Concence SuperSorter meets that long-felt need for a multiple spigot, rising current classifier of sufficiently high capacity to handle economically coal, sand, iron ore, phosphate rock and similar granular minerals.

Capacities and Performance

Capacities and Performance
The first battery of four 8-cell units installed has been in successful commercial operation for over five years, classifying ¼" x 0" feed to a large battery of coal washing tables. Each SuperSorter unit handles in excess of 100 tons per hour, demonstrating phenomenal performance for both tonnage and efficiency. In the production of concrete sand, to the strictest engineering specifications, the SuperSorter has proved eminently successful. On minus 8 mesh sand, an 8-cell unit produces 130 tons per hour of accurately classified products.

Dimensions

The size and proportions of the Concenco SuperSorter may be quickly visualized from the following general data covering the 8-cell machine. The overall height, including 6" H-section supporting legs, is 14 feet. It is 6 feet wide and 40 feet long. Approximate weight, empty, is 16 tons.

Operation

A feature of the Concenco SuperSorter is the innovation for control of spigot discharge. Each classified spigot product is intermittently drawn off, with measured precision, from a quiescent bed at the bottom of the cell. High capacity discharge of product is maintained with minimum water content and without disturbing the rising water currents or unbalancing classification in the sorting column immediately above. The novel constrictor valve mechanisms that control the draw-off from each cell are readily adjustable in operation over a wide operating range from open 90%, to closed during 100% of each cycle. The Constrictor valves permit a positively measured and uniform discharge rate from each cell—a condition essential to the high efficiency of the SuperSorter and to overall efficiency when operating in conjunction with concentrating tables or similar devices.

Water and Power Requirements

Water requirement is low for apparatus of this type. Hydraulic water is brought to the individual cells by means of a 12" header pipe and regulated with easily adjustable pinch valves. The only power required is for actuation of the tandem operated constrictor valve mechanism. A 1½ horsepower motor with gear reducer amply provides for even the largest multiple cell units. There being no other moving parts, operating costs are amazingly low.

Range

Concenco SuperSorters are now available in a range of sizes to meet the needs of any high tonnage classification problem. The individual cells are incorporated with a rectangular, partitioned tank provided with feed entry, adjustable overflow weirs and overflow exit. All construction is of heavy type.



Now Available with FlexElex

Due to their rugged construction and mechanical simplicity, Leahy Vibrating screens far outdistance other devices in overall equipment life.

The heavy duty vibrator, doubly dust-proofed type and enclosed and forming an integral part of the structural steel bridge assem-

steel bridge assembly, delivers a stronger and more positive vibration than ever before, superenergizing every square inch of screen jacket with the characteristic stratifying-screening-unblinding vibration, that is so highly acclaimed and profitably enjoyed by Leahy users. Leahy differential vibration guarantees open



The Guaranteed Screen

meshes, which in turn insure higher screening efficiency and capacity.

Uses—For wet or dry screening from 3" opening down to fine mesh; also for dewatering and heavy media recovery. Unexcelled for screening at fine meshes.

Features—The new Leahy Screen has simplicity combined with proved ruggedness. Installation is inexpensive, with supports figured for dead load only, because no vibration goes into the screen frame or supports and only ½ H.P. is used to operate. The heavy duty vibrator, running-in-oil at 265 r.p.m., produces 1200 to 2000 v.p.m. as needed. Maintenance is negligible—averaging less than 1% of first cost annually. Screen jacket economy is reflected in costs as low as \$0.000574 per ton treated. The quickest jacket change feature offered in screening equipment combines with the use of reasonably priced stock jackets, woven wire or special preparation.

Types and Sizes—Open type, totally enclosed dustproof type; single or double surface; single vibrator; double vi-

brator; belt drive or motor drive in sizes: 17x32 in.; 2x4 ft.; 3x5 ft.; 3x6 ft.; 3x7 ft.; 4x5 ft.; 4x6 ft.; 4x7 ft.; 4x8 ft. Size designation indicates the overall dimensions of the screen jacket. Special sizes built to order.

Hex Elex Electric Heating of Wire Screen Cloth



The FlexElex heating arrangement is engineered especially for fine mesh screening of damp materials such as gres, fine coal, clays, shales, pulverized limestone, chemicals, etc.

A low voltage, high amperation also the arrangement of the screen company of the scre

A low voltage, high amperage electric current is passed through the screen cloth, causing it to heat sufficiently that the wires are kept warm and dry, to prevent any buildup of dust-size fines that contribute to blinding.

When the advantages of FlexElex are added to the Leahy's unblinding action for disposing of intermediate size particles, the result is an efficiency and capacity never before achieved in the screening field. Screening at an accustomed mesh, capacity is stepped up to an astounding degree. On the other hand the same capacity may be maintained with smaller mesh openings formerly considered impractical.

DESCRIPTION. The FlexElex electric jacket heating system for the average size Leahy Screen comprises: a 15 KVA dry type, single phase transformer with line voltage primary and low voltage secondary, complete with switches and controls for closer adjustment of current and heat used; high capacity copper bus bars connecting transformer terminals to copper contact bars of screen jacket assembly through short, flexible copper connectors, permitting quick attachment or detachment at diagonally opposite corners of the screen; complete insulation of the wire jacket from all other metal parts of the screen; and all necessary supporting brackets.

POWER REQUIRED for the average size screen amounts to only 9 or 10 KVA under normal temperature and moisture ranges. With the FlexElex system it is easy to regulate the current to meet day to day or season to season operating conditions with optimum results at minimum power consumption.

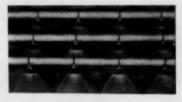
SCREEN JACKET CHANGE TIME. Screen jacket changes can be made with the same ease as with conventional type Leahy Screens. Furthermore, jackets need not be changed as often. Field experience shows that even with less expensive grades of cloth, the life of electrically heated jackets, requiring no beating or brushing, is several times that of unheated cloth.

OVERALL ECONOMICS. Users say that the elimination of attendants for cleaning screen cloth, as well as materially reduced power consumption on the grinder (resulting from the accompanying reduction of circulating load, credited to increased screening efficiency of FlexElex equipped screens), generally more than offsets the cost of the equipment and power used to heat the screen cloth.

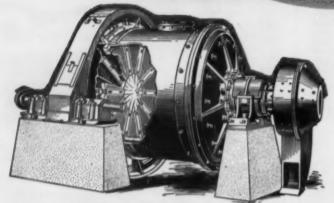
Concenco Spray Nozzle-Water Sprays

Concence Spray Nozzles are unique and efficient. They are easy to apply. A hole is drilled in the pipe and the nozzle bolts on by means of a brass "U" bolt. No threading is necessary. The jet is a flat line spray very effective in

washing or screening. The jets can be perfectly aligned one with another for sheet flow washing. The J-132 series with orifices of ½" to ½" fit 1" to 2" pipe. The J-136 series with orifices of ¼" to ½" fit 2" to 4" pipe.



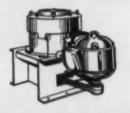
* * * DIRECTORY of



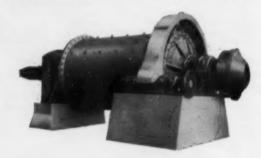
Marcy Grate Discharge Ball Mill

Massco Gy-roll Reduction Laboratory Crusher

Reduces ½" feed to as fine as 10 mesh in single pass. High capacity with low power consumption. 6" and 10" sizes.



For Wet or Dry Grinding of ore, cement, clay or fibrous materials. Types, sizes and capacities for from 5 tons up to 3000 tons per 24 hours. Marcy Grate Discharge Ball Mills and Open End Rod Mills have unique features resulting in quick discharge, maximum useful grinding, minimum overgrinding and better metallurgy. Used throughout the world.



Marcy Open End Rod Mill

Massco-Grigsby Rubber Pinch Valves

Designed for abrasive and corrosive pulps. Patented hinged sleeve for longer wear. 1" to 12" diameter. Up to 150 pounds continuous pressure.



Massco-Adams Reagent Feeders

For wet reagents and other liquids. No mechanically driven moving parts. Only one micrometer screw adjustment. Siphon principle. Requires no electrical connections.



Massco Laboratory Jaw Crusher

Welded steel frame; manganese steel jaw and check plates; bronze bushed bearings; smooth jaws give better product and easier cleaning. Adjust for plate wear by convenient hand wheel adjustment.



Massco-Adams Density Controller

Automatically regulates water dilution of pulp in grinding circuit to maintain constant percent solids—thus, controls size of finished product.



cost-cutting equipment

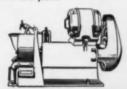
Akins Classifiers are made in sizes from 12" to 84" dia., simplex and duptex. They are used for classification of solids by size, dewatering, washing coal, preparation of china clay and glass sand, desliming and de-oiling phosphate rock, sink-float concentration. Used throughout the world by hundreds of the best companies in the mining and process industries.

Akins Classifiers and HMS Separators



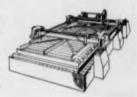
Massco-McCool Pulverizers

Disc type grinder with planetary movement. No gears. Will grind to 150 mesh in one pass.



Lowden Dryer

For drying flotation concentrates, graphite, clays, ground minerals, paint fillers, pigments, various precipitates. Can use most any fuel including live steam and waste heat.



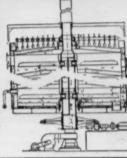
Wilfley Tables

For separation of any ore or material amenable to gravity concentration. Laboratory and commercial sizes—up to 180 tons capacity per 24 hours.



Skinner Roasters

For roasting and calcining ores, clays, limestone, limestone mud; decomposing oil sludge in process of producing sulphuric acid; incinerating sewage and garbage. Coal, oil or gas fired. Sizes to 22' inside diameter; up to 12 hearths.



FOREIGN REPRESENTATIVES

MINE & SMELTER

Licensed Manufacturers and Sales Representatives:

Canadian Vickers, Ltd., Montreal, Canada The Austral Otis Eng. Co., Ltd., So. Melbourne, Austr. Morgardshammers Mek. Verkstads Aktiebolag, Mogardshammer, Sweden

Pegson Limited (for England & Africa) Coalville, Leicestershire, England

Sales Agents:

W. R. Judson, Santiago, Chile
The Edward J. Nell Co., Manila, P. 1.
The Ore & Chemical Corporation, 80 Bread Street,
New York City 4, New York
Representatives for Continental Europe

COLORADO IRON WORKS

Licensed Manufacturers and Sales Representatives: Canadian Locomotive Co., Ltd., Kingston, Ont., Canada John Carruthers & Co. (Pty.), Ltd., Sydney, Australia Head, Wrightson & Co., Ltd., Stockton-on-Tees, England Head, Wrightson & Co., S. A. (Pty.), Ltd., Johannesburg

Sales Agents:

Andrews and George Co., Inc., 5 Shiba Park, Takyo, Japan Continental Sales and Equipment Co., Hibbing, Minnesota Edw. J. Nell Co., Manila, P. I. Wright Bros., Credit Foncier Bidg., Vancouver, B. C., Canada

Mine & Smelter Supply Co.

AND ITS SUBSIDIARY COMPANY

COLORADO IRON WORKS CO.

Denver 17, Colorado

OFFICES IN SALT LAKE CITY, EL PASO, 1775 BROADWAY, N. Y. C. CATALOG, DEVELOPMENT AND DIRECTORY NUMBER, 1954

Denver 2, Colorado

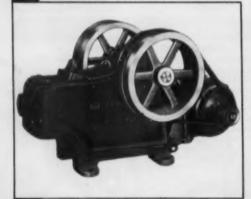
[World Mining Section-285]

DFC ASSAY EQUIPMENT

DFC ASSAY FURNACE



DFC METALLURGICAL CLAY GOODS



DFC LABORATORY CRUSHER

For fast-uniform assays

Since 1876, mining operations all over the world have found it highly convenient to rely on the complete assay lab service offered by THE DENVER FIRE CLAY COMPANY.

We can supply equipment for your entire labeverything, from lab furniture to a test tube-with assay Furnaces, Crushers, Pulverizers, Metallurgical Clay Goods, samplers and sieves in between.

DFC ASSAY FURNACES

DFC "performance-proved" assay furnaces are available in gas-fired, oil-fired and electric models. A variety of sizes and available combinations make it possible for us to give you furnace facilities which will best handle the volume of work in your particular operation.

METALLURGICAL CLAY GOODS

The popular line of DFC metallurgical clay goods includes crucibles, muffles, annealing cups, roasting dishes, scorifiers, trays, ignition cups and cupels... every piece is designed and made to meet the specific conditions to which it will be exposed. For dependable results, everytime, insist on DFC metallurgical clay goods.

DFC LABORATORY CRUSHERS

DFC crushers enjoy a fine world-wide reputation—for a good reason. They are built for fast reduction of ore samples to uniform size. They are built to give years of trouble-free, efficient performance. Two sizes with flat or V-belt motor drive are available. Pitman-toggle movement, reversible jaws, removable jaw plates, and replaceable shims are just a few features which make the DFC crusher outstanding.

Other DFC Manufactured Assay Equipment

Other DFC assay equipment stamped with the DFC trademark of quality:

DFC Cupel Machines

DFC Samplers

DFC Sieves

These too are designed for long-life, and top performance.

WHERE AN ACCURATE ASSAY BEGINS



Write for information

weco

Vibrating Screen Separators

Sweco Separators have increased throughput and efficiency . . . reduced screening costs . . . in hundreds of pit and quarry operations throughout the world. Longer screen life . . . quieter operation . . . and easier adjustment on the job make it the most versatile and economical screening equipment available.

Some of the mine and quarry products screened on Swecos:

Beryllium Chrome Copper Ore Diatomaceous Earth Dolomite

Feldspar Graphite Gypsum Lead Ore Limestone Magnesium Ore

Magnesite Mica Nitrates Perlite

Potash

Silica Sand Zinc Ore

New "3-D" Screening Action

Swees Separators tumble the material in all three directions at once. Controlled spiral action increases capacity . . . increases screening accuracy . . . reduces blinding and clogging.





5 Fractions—98% Efficiency Typical SWECO Performance

Tandem installation of 15 single and multi-deck 48" Sweco Sep-Sweco Separators in silica sand plant produces 5 sizes, from minus-10 to minus-60.



SPECIFICATIONS

Screens 10 to 325 mesh. Choice of material. No. of Fractions 2 to 5, depending on number of frames. Exposed Screening Surface Carbon steel or stainless steel

48" Diameter

HEIGHT* WEIGHT* MOTOR

31" to 48" 850 to 1500 pounds

60 cycle, 3-phase, 1200 rpm, 1 hp, 220 or 440 V.



18" Diameter HEIGHT*

" to 26 WEIGHT* MOTOR

180 to 210 pounds 60 cycle, single or 3-phase, 1200 rpm, ¼ hp, 115, 220,

Height and weight vary, depending on number of spacing frames.





Long Screen Cloth Life:

Each screen cloth is held in uniform tension in all directions by drawing it taut and floating its center on an adjustable spring-tension mounting. The drum-tight acreening surface thus vibrates freely without whipping against rigid supports. Consequently, the screen is not blinded or worn, and screen cloth wear is thereby greatly reduced. In commercial operation Sweco Separators have extended fine mesh screen cloth life many years.

Low Upkeep:

Simplicity of design has reduced wear, the number of Simplicity of design has reduced wear, the number of wearing parts, and provides for easy replacement. Rotation of the free-running motor shaft and bearings, and slight expansion and contraction of the supporting springs are the only mechanical movements.

Less Floating Dust:

The Sweco Separator raises less dust since the material is tumbled, not violently bounced, across the screening surfaces. Except for its open top, the unit is totally enclosed. If desired, a cover with feed spout can be

Complete and Ready to Use:

The separator is completely self-contained and houses its own motor. It comes to you completely assembled. Installation requires that it be set in place, without special foundation, and the power connected.

No Substructure Vibration:

The gyrating screen assembly floats freely on its supporting springs. As a result, when the separator is placed on any firm, level flooring, no vibration is trans-mitted to its supporting base or to the flooring of adjacent machinery.

Because of its light weight and lack of transmitted vibrations, the Sweco Separator may be mounted on top of bins, on the upper floors of tall buildings, or on a light, existing structure not previously constructed to support vibrating mechanisms.

Adjustability

The compound gyratory motion is readily adjusted to vary the degree of tumbling and the spiral travel of the vary the degree of tumoning and the spiral travel of the material or length of contact time to provide exactly the separation required for each particular job application. Multiple screens of different opening size permit sep-arate recovery of different fractions, each accurate in size range.



Southwestern Engineering Company Engineers and Constructors, Manufacturers Dept. 21-283, 4800 Santa Fe Avenue,

Los Angeles 58 Cable address, SWECOLA

Free Analysis and Recommendations

Sweco District Engineers are available to make detailed analyses and recommendations on specialized screening operations, without cost to you. Sweco Separators are sold on a guaranteed performance basis. Catalog available on request.

THE W. S. TYLER COMPANY

3615 SUPERIOR AVENUE . CLEVELAND 14, OHIO

New York 17, N. Y 247 Park Ave.

Boston 16, Mass. 20 Providence St.

Lincoln-Liberty Bldg.

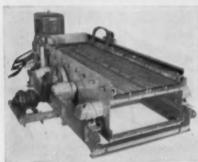
Atlanta 3, Ga. Hurt Building

Dallas 1, Texas Mercantile Bank Bldg.

San Francisco 5, Calif. 215 Market St. Canadian Plant & Office—St. Catharines, Ontario

Los Angeles 57, Calif. 2404 W. Seventh St.





Ty-Electric Heated Ty-Rock Scre





WOVEN WIRE SCREENS

Supplied in all meshes and metals and for all purposes. Tyler Woven Wire Screen is noted for its accuracy and dependability. More than 7,000 specifications are manufactured, many of which are kept in stock ready for immediate shipment.

Write for Catalog 74, Specification Tables of Tyler Woven Wire Screens.

TY-ROCK SCREENS

This full-floating circle-throw screen combines immense capacity with low operating costs — especially for coarse and medium sizing. This is the ideal screen wherever huge tonnages of coal is handled and where flat or low angle screening is desired. Send for Catalogue 65.

TYLER-NIAGARA SCREENS

High-speed circle-throw screens for economical screening of coal products. Send for Catalogue 64.

TY-ELECTRIC HEATED SCREENS

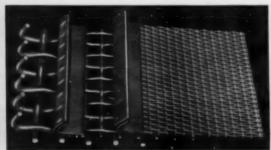
The Ty-Electric System of electric heating of Ty-Rock & Hum-mer Screens represents the most recent development in screening damp materials. The woven-wire screens are heated by passing electric current through the wires. Heat keeps the surface of the wire dry so that fine damp particles will not stick on the wires and blind the openings. Send us details of your damp screening problems so we can make recommendations.

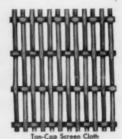
TYLER HUM-MER SCREENS

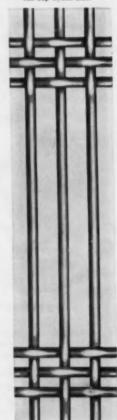
The Hum-mer was the first electrically vibrated screen and is still, by far, the lowest in operating cost for accurate sizing of medium and fine material. The Hum-mer employs less than one H.P. per vibrator and is furnished in one, two or three deck units in both open and closed models. Send for Catalogue 63.

TYLER TESTING SIEVES AND TESTING SIEVE SHAKERS

Tyler Standard Screen Scale Testing Sieves are the accepted standard for sieve testing throughout the world. The Ro-Tap Testing Sieve Shaker and the Ty-Lab Tester assure comparable, accurate data. Send for Catalogue 53.









Allis-Chalmers is the world's largest manufacturer of equipment for the mineral industries. The wide variety of A-C products has brought together one of the most diversified groups of engineering specialists in all industry. That means you can get expert equipment recommendations from A-C.

There's no guesswork when you specify Allis-Chalmers Engineering. The A-C staff, working with your staff, analyzes your problem or process and looks for ways to make existing equipment "team up" with the new equipment for greater production. And the recommendation will be unbiased, because A-C builds many types and sizes of equipment. The selection will be dictated by exactly what you need, not

an improvised arrangement

Trained engineers in the A-C chemical and processing laboratories help solve tough problems by testing samples of your product. This is another precaution that exactly the right equipment is selected for your particular plant.

And Allis-Chalmers not only builds the basic machinery, but also the motors, drives and control needed to run it—it is the only company that builds all this machinery in its own shops. This means a "packaged" unit or process, with every part engineered to work efficiently with every other . . . assures you of higher efficiencies, lower costs, undivided responsibilities. And Allis-Chalmers stands behind every unit 100%!

ALLIS-CHALMERS Equipment for the . . .

MINERAL



Sales Office	
Jaies Office	
ALABAMA	Telephone
Birmingham 3, 2000 First Ave., N	orth4-5494
AKIZONA -	
Phoenics, 50 West Madison St	ALpine 3-2159
CALIFORNIA	
Los Angeles 15, 417 S. Hill St	Madison 6-2231
San Diego 1, 747 Ninth Ave	BEImont 4-4684
San Diego 1, 747 Ninth Ave	Douglas 2-8384
EDLORADO	
Denver 2, 909 17th Street	Cherry 6556
CALL IN CONTRACT ON	
Hartford, 750 Main St New Haven 10, 157 Church St	Chanal 6 5675
Now House 10 197 Church St	State 7.1176
DISTRICT OF COLUMBIA	CONTRACTOR 1-1110
Washington 5, 14th & H Sts., N.W.	E
	' THEORETAS 3-5000
PLORIDA	
Jacksonville 7, 1628 San Marco Be	mlevard98-6441
Miami 32, 25 S.E. 2nd Avenue	
Tampa 2, 405 S.' Morgan St	2-6571
GEORGIA	
Atlanta 3, 57 Forsythe St., N.W	Walnut 7116
ILLINOIS	-
Chicago 5, 135 So. LaSalle St	Franklin 2-6480
Peoris 2, 301 S. Adams St	4-9279
Rockford, 303 North Main St	9-9721
INDIANA	
Evansville 9, 129 Locust St	4-8219
Indianapolis 4, 11 S. Meridian St.,	MArket 7415
IOWA	
Davenport, 326 W. Third St	3-9793
Des Moines, 206 Sixth Ave	3-8682
KANISAS	
Wichita 2, 107 South Main Street.	Forest 3-9762
MENTERNA	
Louisville 2, 241 S. Fifth St	Clay 7656
LOUISIANA	The same of the same
New Orleans 12, 210 Baronne St	Baumand 6625
Shreveport 23, 624 Travis St	2.5274
MAINE	
Augusta, 2691/2 Water St	Augusta 46]

MARYLAND Baltimore 18, 1115 East 30th St HOpkies 7-4480
Boston 16, 31 St. James Ave
MICHIGAN Detroit 2, W. Grand Blvd. & 3nd Blvd
Trinity 1,2300
Grand Rapido 2, 5-7 Lyon St., W
MINNESOTA
Duluth 2, 10 E. Superior St
MISSOURI
Kantas City 6, 6 Bast 11th St. Victor 0182
Kansas City 6, 6 East 11th St
BACOUTTABLA
Butte, 81 Hirbour Building 27341
NTBRASEA
Omaha 2, 14th & Farnam StsAtlantic 1780
NEW JERSEY
Newark 2, 1060 Broad StMarket 3-7170
NEW MEXICO
Albuquerque, 325 5rd St., S.W
NEW YORK Buffalo 3, 335 Washington St.,Washington 1741
Now York 7 50 Church St. Beckman 3,0100
New York 7, 90 Church StBeekman 3-9100 Rochester 4, 241 East Ave
Syracuse 2, 472 S. Salena StSyracuse 3-0147
NORTH CAROLINA
Charlotte 2, 212 S. Tryon St
0800
Akron 8, First National Tower
Cincinnati 2, 617 Vine St
Tolodo 4 249 Superior Ave., N.EMain 1-7182
Cincinnati 2, 617 Vine 8t. Main 7360 Cirveland 14, 815 Superior Ave., N.E. Main 1-182 Toledo 4, 243 Summit 8t. Adams 3269 Youngstown 3, 25 E. Boardman 8t.
Riverside 5-5175
OKLAHOMA
Oklahoma City 1, 401 N, Harvey StRegent 9-1631 Tules 3, 320 E. Archer St
Tules 5, 320 E. Archer St
OREGON
Portland 4, 520 S. W. 4th Ave. Capital 9855

PENNSYLVANIA Philadelphis 3, 1617 Pa, Blvd. Bistenhouse 6-5412 Pittsburgh 19, 421 Seventh Ave. Atlantic 1-4154 Wilkes-Barre, Market & Franklin Str. VAlley 3-2415
York, 42 East King St
Providence 3, 111 Wessminster StJackson 1-8810
TENNESSEE Chattanoogs 2, 737 Market St
TEXAS Amarilio, 501 Polk St
Dallas 2, 1800 N. Market St. Randolph 7144 Fort Worth 1, 409 West 7th St. FAnnin 5085 Houston 5, 1719 McKinney Ave. Preston 508 San Antonio 5, 902 Forto National Bank Bldg. C-7022
UTAH Salt Lake City 1, 156 S. Main St
VIRGINIA Richmond 19, 627 East Main St
WASHINGTON Sentile 1, 1318 4th Ave
WEST VIRGINIA Charleston 1, 179 Summers St
WISCONSIN Milwaukee 2, 715 N. Van Buren St., BRoadway 1-4729
CANADA Montreal, Quebuc, 1520 Mountain 56. Ms. 2411 Toronto, Ostario, 629 Adelaide 5t. W. Empire 4-0486 Winnippe, Maniroba, 96 Albert St. 9283-5 Caigary, Alberta, 805 Greybound Bidg. Main 3800 Vancouver, B. C., 1200 W. Pender St., Tatlow 4718
Distributors by all principal alting thereachess

the United States

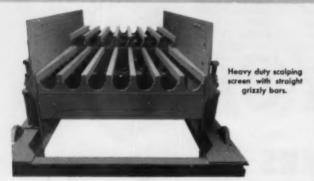
Offices and distributors located throughout the world

ALLIS-CHALMERS



VIBRATING SCREENS FOR

PRIMARY SCALPING SCREENS



Steel plate deck with 4-in, square openings and rectangular skid bars.

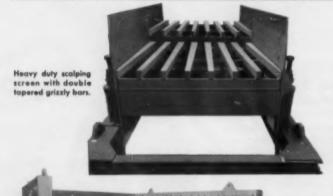


for 3-ft maximum size pieces

Heavy duty screens are designed to scalp ahead of primary crushers, to handle feed direct from mine in lumps up to 3 ft diameter at capacities of 100 tph or more. These screens are furnished with a wide variety of decks to suit each application, such as the step deck with straight grizzly bars or perforated plate deck with skid bars for openings 4 to 10 inches.

Scalping screens with straight grizzly bars are available with the bars set to provide flared openings, which prevent wedging of large pieces between bars. Screening surface is easy to replace. Grizzly bar assembly is made in panels for bolting to the screen body. Screen openings are 4 to 10 in. A complete line of two-bearing screens are built by Allis-Chalmers for this service.

SECONDARY SCALPING SCREENS



Free discharge rad deck.

for 16-inch maximum size pieces

Two types of decks are available for handling sticky ores, approximately 16 in. maximum feed size. These are the step deck with double tapered grizzly bars and the free discharge rod deck. The grizzly bar deck has openings 4 to 10 inches; the rod deck has openings 1 to 3 inches, using % to 1-in. diameter rods.

Both decks have a step construction which results in free discharge of the material through the bars or rods and assists in turning the lumps over on the screen to prevent fines from riding on top of the material.

A complete line of Allis-Chalmers heavy duty screens is built with this type of construction.

EVERY APPLICATION IN MINING . . .



The success of the heavy media process is due in large measure to the successful operation of *Low-Head* vibrating screens used as primary screens ahead of the heavy media

separator and as media recovery wash and drain screens following the separator.

Allis-Chalmers pioneered in the development of screens for this important process. In heavy media plants, Low-Head screens are by far the most widely used screens. Allis-Chalmers builds Low-Head screens in sizes for every capacity needed in this process.

Screen with partition permits handling both sink and float products. Two partitions permit handling sink, float and middlings.

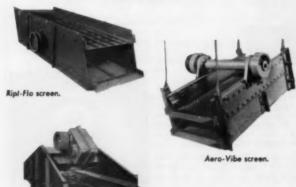
WASHING SCREENS

Vibrating screens are used for washing materials having contaminants of moderate to low adhesive characteristics. They are also used for sizing, rinsing and dewatering material following blade mills and scrubbers. Screens are equipped with spray pipes and jets for wet screening.

Several types of Allis-Chalmers screens are available for washing in single, double or triple deck models. For most thorough washing, rinsing or media recovery, the Low-Head screen can be furnished with repulping pockets. Material is repeatedly sprayed and screened. Step construction turns material over for more exposure to washing action. Requires less spray water than conventional screens.



SIZING SCREENS

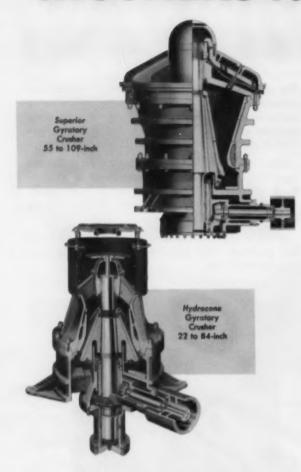


Ripl-Flo Inclined Screen. A two-bearing screen for moderate to heavy duty screening, coarse to fine, scalping, rinsing, wet or dry screening. Sixteen sizes, 3 x 6 to 6 x 16 ft. Circular vibratory motion. Suspended or floor mounted. Available with "Tri-Slope" deck for fine granular materials 1/4 x 0 to 35 mesh, or with Stat-Kleen or Thermo-Deck construction to eliminate blinding. Bulletin 07B6151.

Aero-Vibe Screen. For sizing medium to fine materials. Feed size up to 3 inches; separations 1½ inch square to 28 mesh. Screen sizes 2 x 4 to 5 x 10 ft, 1, 2 or 3 decks. Self-contained vibrating mechanism located above screen body. Open or enclosed models; suspended or floor mounted. Light in weight; easy to install; low in cost. Bulletin 07B6099.

Low-Head Horizontal Screen. For wet or dry screening, rinsing or dewatering of semi-fine to semi-coarse materials 2½ inch to 10 mesh openings. Sizes 3 x 6 to 6 x 20 ft. Mechanism imparts a straight line vibratory motion to screen. Heavy duty Low-Head screen available with straight or stepped deck for fine wet screening. Bulletin 07B6330.

CRUSHERS FOR EVERY MINING JOB



GYRATORY CRUSHERS

For high capacity primary or secondary crushing. Sizes 30-55 to 60-109 (60-inch feed opening, 109-inch diameter cone at crushing point). Capacities 170 to 3500 tph.

Cast steel construction makes the Superior gyratory crusher highly resistant to shock. Integrally cast reinforcing rings on top and bottom shell provide additional strength. Straight down discharge eliminates need for diaphragm. The crusher has been designed with a greatly improved automatic lubricating system and dust seal.

The curved crushing chamber, based on over a half century of experience in building gyratory crushers, provides a broad area of breaking contact and spreads wear over more crushing surface. The mainshaft can be raised with respect to the concaves to compensate for wear on mantle and concaves. Send for Bulletin 07B7870.

For secondary or tertiary crushing. Sizes 122 to 1784 (17-inch feed opening, 84-inch diameter cone at crushing point). Capacities 7 to 1050 tons per hour. Available with coarse, intermediate or fine crushing chambers.

Hydraulic operation makes possible rapid crusher setting adjustment without stopping the main driving motor. On the smaller machines product size adjustments are made with a hand crank, on larger crushers with electrically operated push-button control.

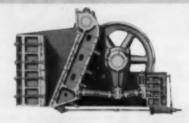
Hydraulic operation also lowers the crushing head to pass tramp iron or other uncrushable materials through the crushing chamber, then raises the head back to the original crusher setting, smoothly and without shock. Send for Bulletin 07B7145.

JAW CRUSHERS

A-1 Jaw Crusher—Sizes 36 x 25 to 84 x 60 in. for primary breaking of tough, abrasive materials in blocky feed sizes. Long, deep crushing chamber results in large capacity, minimum slippage and uniform wear on jaw plates. Straight or non-choking jaw plates. Bulletin 07B6369.

HAMMERMILLS

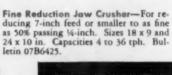
Pulverator — An impact crusher for primary breaking of soft material for reduction of non-abrasive rock by "multi-impact." Five sizes. Handles up to 6-inch feed. Capacities 2½ to 125 tph. Revolving flat hammers hurl material against a succession of involute breaker plates, reduce it to fine, cubical particles without slivers. Send for Bulletin 07B6265.



ROLL CRUSHERS

Crushing rolls handle a wide range of "sticky" or "packy" materials. Rolls are driven independently by large flywheel sheaves. Sizes from laboratory rolls to 78-inch diameter rolls. Bulletin

Fairmount single roll crushers are built by Allis-Chalmers. Sizes 24 x 48 to 36 x 60-in, rolls.



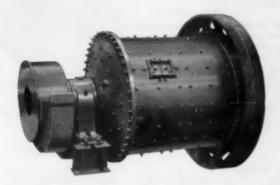
Blake Jaw Crusher—Five sizes, 10 x 7 to 30 x 18 in. A standard double toggle machine for medium and small plants.

Send for Bulletin 07B7090.



Hydrocone, Superior, A-1, Pulverator, Fairmount, are Allis-Chalmers trademarks.

GRINDING MILLS ALL TYPES



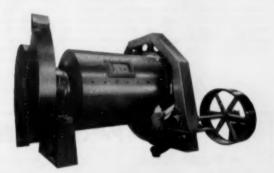
BALL MILLS

Sizes 3 to 12½ ft diameters, 3 to 16 ft lengths. For producing a finely ground product of 28 to 325 mesh from a feed size of about ½ inch. Ball mills are unsurpassed for the fine grinding of moderately to extremely abrasive materials.

Overflow type ball mills are used for fine wet grinding in closed circuit with a classifier. Many processors have turned to this type to reduce liner and grinding media replacement cost. Diaphragm type ball mills are universally used for fine or coarse, wet or dry grinding in closed circuit with a classifier, screen or air separator. Bulletin 07B6718.

OVERFLOW ROD MILL

Sizes 3 to 10½ ft diameters, 6 to 13 ft lengths. Rod mill product can be varied from 6 to 35 mesh, with a minimum amount of fines. Because a rod mill can reduce a 1-inch slot size feed, it has supplanted the last stage of crushing in many plants. The screening action of the rods within the mill produces an ideal ball mill feed, free from tramp oversize, without the use of close circuiting screens. Bulletin 07B6718.



PERIPHERAL DISCHARGE ROD MILL



Sizes 3 to 10½ ft diameters, 6 to 13 ft lengths. The peripheral discharge rod mill was developed for those dry grinding circuits where close control was required for either the product top size or the fines. In addition to these dry grinding applications, either the end peripheral or the center peripheral discharge rod mill may be used in wet circuits where specific product requirements must be met. Bulletin 07B6718.

Allis-Chalmers also builds Pebble Mills, Preliminator Ball Mills, multi-compartment Compeb and Ballpeb Mills.

FEATURES OF ALLIS-CHALMERS GRINDING MILLS

- ${f 1}$. Shells are rolled from heavy steel plate and automatically welded with full penetration welds.
- ${f 2}_{\circ}$ Main bearings are of the trunnion type, sufficiently large to permit low bearing pressures and to allow the use of all types of mill feeders. Oil or grease lubricated bearings. Larger mills are fitted with a lubricant pump, which floats an idle mill on a film of lubricant before starting.
- $oldsymbol{3}_{\circ}$ Mill heads are cast in one piece, a design which results in highest strength per pound of metal used.
- 4. Pinionshaft bearings are grease or oil type roller bearings. Long addendum spur pinion and short addendum gear are engineered to meet exacting mill drive requirements.
- 5 . Complete 360° gear guard and lubrication housings are fitted on all mills operated under dusty conditions.
- $\hat{\Phi}_o$ Mill, drive, motor and starter can all be obtained from Allis-Chalmers as a complete unit. Responsibility for efficient performance rests with only one company.

Compeb and Bullpeb are Allis-Chalmers trademarks.

ALLIS-CHALMERS WASHING EQUIPMENT



Blodo Mill—For cleaning large tonnages of hard-to-wash materials. Blade mills disintegrate and wash into suspension tenacious clays on materials up to 10-inch ring size. Angularly adjustable blades provide a combined cutting and washing action. Blade mills are supported on trunnion bearings instead of rollers, making possible faster mill speed for more intensive washing. Sizes 6 to 9 ft diameters,

Rotery Scrubber — An economical washing mill for applications where only a small amount of scrubbing action is necessary. Handles material up to 4-inch ring size. Adjustable internal lifters agitate and create a cascading action of feed. For light service. Available with perforated plate dewatering section.



Screw Wusher — For easy-to-wash materials of ½-inch ring size. Continuous helical blades force material up inclined trough against a stream of water entering below discharge opening, leaving a section at upper end for dewatering. Product is controlled by regulating screw speed.



PYRO-PROCESSING EQUIPMENT

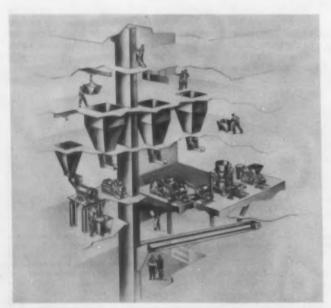
• Rotary Kilns

10 to 22 ft lengths.

- Air-Quenching Grate Coolers
- Converters

- Rotary Coolers, Dryers
- Holding Furnaces
- Feeders

Send for Bulletin



Pilot plant section of A-C Research Laboratory showing processing equipment available for crushing, grinding and concentration of rock and ore in quantities up to 20 tons per day.

RESEARCH FACILITIES

The Allis-Chalmers Processing Research Laboratory is a service organization for investigating problems that develop in the beneficiation of raw materials in the processing industries. Its facilities and technically trained personnel are available to you for pre-testing processing methods.

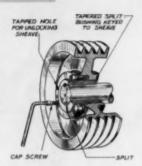
The laboratory contains complete batch testing facilities and semi-commercial scale pilot plant equipment. Technologists test and process your material samples and make recommendations for altering your methods to obtain more favorable operating economies.

Five floors of equipment provide facilities for crushing, cement and mining tests; grain tests; pulp and wood processing tests; oil extraction research. A physical and chemical laboratory and a metallurgical research section are also part of the Laboratory. Crushing and grinding tests on a wide range of rock and metallic ores have resulted in an accumulation of reliable data which is available to our customers. Send for Bulletin 07B6419.

A DRIVE FOR EVERY MACHINE

Texrope—greatest name in V-belt power transmission—is the registered trademark of Allis-Chalmers, originator and pioneer of multiple V-belt drives.

Ask for Bulletin 20B6051, "Handy Guide to Selection of Texrope Drive Equipment"; it tells the complete Texrope Drive story . . . V-belts . . . sheaves . . . and how to figure a Texrope drive.



MAGIC-GRIP SHEAVES

The Magic-Grip cast iron sheave is designed for fast, easy mounting and demounting. Construction is simple, foolproof. Sheave comes completely assembled with bushing—ready for instant installation on shaft. Simply place assembled unit on shaft—slide it to desired position and tighten capscrews. Uniform grip of bushing sleeve on shaft. All torque is transmitted through keys. The result is smooth running performance—no wobbling—no vibration! Stock sizes for drives up to 150 hp. Larger sizes available on order.

TEXROPE V-BELTS

Famous patented grommet construction provides longer life than ordinary V-belts. Made with straight sides for greater grip. Types for all operating conditions: heat-resisting; oil-resisting; static-resisting and special High Capacity. Also available: Texrope wide range V-belts for use with wide range V-ari-Pitch Speed Changers.



Select Constitution

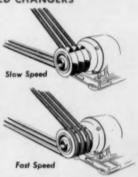
Wide Range Belt

VARI-PITCH SHEAVES AND SPEED CHANGERS

VARI-PITCH SHEAVES are available in two types; Standard Range for A, B, C, D or E belts—capacities from 1 to 300 hp—speed variations up to 28%. Wide Range for Q and R belts—capacities from 1½ to 40 hp—speed variations up to 100%. Both types designed with stationary or motion control features—Stationary Control for infrequent changes when sheave is stopped; Motion Control for repeated speed changes while sheave is in motion.

Vari-Pitch Speed Changers furnish 3% to 1 speed ratio in one compact, enclosed unit. Adjustable while in motion. Combines two wide range, worm gear-adjusted sheaves. Manual or pushbutton control.

For complete engineering information on available speed drives — ask for Catalog 20B7749.



MOTORS FOR EVERY DRIVE

Allis-Chalmers builds a complete line of polyphase squirrel cage, wound rotor, synchronous, and direct current motors with electrical and mechanical modifications to meet any application. Ask for Bulletin 51B6052, "Handy Guide for Quick Selection of Electric Motors"; it furnishes you with enough facts on Allis-Chalmers motors to enable you to select the type which meets your required electrical and mechanical specifications. The next time you need an electric motor, contact your nearby Allis-Chalmers representative.



DRIP-PROOF

Small, tough, general purpose squirrel cage motors. Allaround protection of inner parts. ½ to 200 hp and up. Also in splash-proof types. Bulletins 51B6210 and 51B7693.

SYNCHRONOUS

High torque motors of constant speed, available in ratings of 40 hp and larger. Bulletins 05B7648, 05B7649, 05B6112.



ENCLOSED FAN-COOLED

Protected from dust, grit, vapor, gases. Cooling air circulated around exterior. ½ to 100 hp. Bulletin 51B7225. Also in new tube cooled type to 3000 hp. (51B7149).



CONTROL FOR EVERY MOTOR

Allis-Chalmers makes a line of starters to meet practically all motor control needs. Count on this wide range of starters, backed by industry-wide application engineering experience, for the answer to your control needs. Ask for Bulletin 14B7733.







WOUND ROTOR

For adjustable varying speed service. High starting torque, low starting current. Bulletins 51B6052 and 05B7771.



LARGE INDUCTION

Newly designed. Drip-proof or splash-proof. 60 hp at 300 rpm to 2000 hp at 1800 rpm. Bulletin 05B7542. Also 05B7771.

POWER AND ELECTRICAL EQUIPMENT

As a leading manufacturer of both steam and hydraulic power plant equipment, Allis-Chalmers is in a position to fill your complete requirements for turbines, generators, condensers, pumps, control equipment, etc.

And for power distribution, A-C has transformers, motor-generators, converters, rectifiers, metal-clad switchgear, switchboards, indoor and outdoor circuit breakers, etc.

TRANSFORMERS

From the largest power transformers to instrument and metering transformers in a wide range of types and ratings. Dry type transformers from 3 to 12,000 kva for installation right at load centers.

Transformers also available with Chlorextol non-inflammable liquid for mounting indoors or on roofs. Bulletin 01B6186 for complete line.



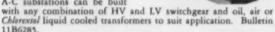
SWITCHGEAR

High and low voltage metalclad and metal enclosed switchgear in all standard ratings to suit your particular requirements. Breakers for HV switchgear can be either oil or magnetic air types. LV switchgear

gear can be either oil or magnetic air types. LV switchgear uses either manually or electrically operated air breakers. Weatherproof switchgear is available for outdoor installation. Switchboards built to suit, in standard or duplex types. Bulletin 18B6185.

UNIT SUBSTATIONS

Completely factory built, unit substations can be installed indoors or out to provide power where you want it . . . to reduce cable costs and line losses . . . to provide better regulation. A-C substations can be built





AIR AND GAS HANDLING EQUIPMENT



Centrifugal blowers are compact, light weight units with only one moving part. Four types available. Motor or turbine drive. Capacities to 130,000 cfm, pressures to 35 lb G. Bulletin 16B6048. Multistage blowers also available. Bulletin 16B6104.



Sliding vane type. Air is compressed in cells formed by blades moving freely in and out of longitudinal slots in rotor eccentric to its casing. Quiet, smooth operation. Units start unloaded. Capacities from 5 to 35 psig.

CENTRIFUGAL PUMPS for almost any service

More than 60 years' experience in designing and building centrifugal pumps goes to work for you when you specify Allis-Chalmers. This engineering background is your assurance of the right pump for your job! Whether your application calls for a single-stage or multi-stage pump, a pump to handle clear liquid, corrosive or abrasive liquids, or liquids containing high percentages of suspended solids, contact A-C for the one pump that will meet your particular requirements. Ask for "Handy Guide to Centrifugal Pumps," Bulletin 52B6059, for the story on the complete A-C line.

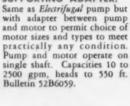




electrifugal. The only close-coupled pump with pump and motor mounted in 'unit-cast' frame and operating on single shaft. Alignment is perfect and permanent. Easy to install. Capacities 10 to 500 gpm, heads to 220 ft. Bulletin 52B6140.



FRAME MOUNTED. Pump mounted on frame with separate shaft. Hundreds of standard ratings available, varying from 1 x ¼ to 8 x 6 in. Capacities from 10 to 2000 gpm, heads to 500 ft. Grease or oil Jubricated. Bulletins 52B6351 and 52B7638.



SUPPORTING ADAPTER.



DOUBLE SUCTION, singlestage for general water supply, circulating or drainage. Coupling has Magic-Grip bushing for easy dismantling or assembly. 66 sizes from 2 x 1½ to 18 x 16 in. Capacities 30 to 7000 gpm, heads to 475 ft. Bulletin 08B6146.



SOLIDS. For applications wherever large percentages of suspended solids must be circulated. Few working parts, all readily accessible. Capacities to 10,000 gpm, heads to 170 ft. Bulletins 52B6381 (abrasive) 52B7112 (corrosive).



MULTI-STAGE, Single or double suction for clear liquids against high heads. For mine pumping, boiler feed pumping, general water supply systems. Another important use is hydraulic stripping of overburden on top of mine or quarry.

ALLIS-CHALMERS MFG. CO.

846 South 70th Street . Milwaukee 1, Wisconsin



EIMCO EQUIPMENT FOR MINING AND METALLURGICAL INDUSTRIES

AIR POWERED

UNDERGROUND LO MINING-DEVELOPMENT



MODEL 12B SPECIFICATIONS

Overall Width	28"	711	mm
Overall Length (caging)	44"	1117	mm
Overall Length (bucket down)	73"*	1854	mm*
Headroom Required		1994	mm*
Clean-up Range	75"+	1905	mm†
Weight	4500#	2042	kilo

*Standard †Without side plow

The smallest of the RockerShovels requires minimum space for caging. Available with track gauges from 15" to 36". Loading speed 20 to 35 cu. ft. per minute depending on material handled. All parts alloy cast steel. Heavy-duty antifriction bearings used throughout.



MODEL 21 SPECIFICATIONS

Overall Width	331/2"	851 mm
Overall Length (caging)	55"	1397 mm
Overall Length (bucket down)	87"*	2210 mm*
Headroom Required	88"*	2235 mm*
Cleanup Range	90"†	2286 mm†
Weight		3265 kilo

*Standard †Without side plow

Medium sized RockerShovel. May be easily caged on most mine cages. Available in track gauges between 18" and 48". Loading speed 35 to 50 cu. ft. per minute depending on material to be loaded. Constructed of alloy cast steel parts with heavy-duty antifriction bearings throughout.



MODEL 40H SPECIFICATIONS

Weight Complete 16,850# 7643 kilo

Largest rail type underground Rocker-Shovel. Available in standard track gauges between 28" and Standard Railroad or larger. Loading speed 60 to 100 cu. ft. per minute. This model can be furnished to tram on 24" gauge tracks. Cast alloy steel parts are used throughout with heavy-duty antifriction bearings.

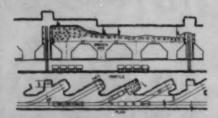
PRODUCTION LOADING

In recent years many companies have used Eimco mechanical loading equipment for production as well as development work. Advantages of the mechanical loader in drawpoints have been checked and re-checked by many companies who keep costs on the use of mechanical loading and loading with the chute and grizzly system. Some of these people have developed new sections of mine reserves with part in chute and grizzly systems, and another part in drawpoint system—using Eimco's for production loading. These companies



have kept costs from the start to prove to themselves which method was best. Results from these tests have invariably shown that when an ore body could be mined in any manner so that the ore could be loaded into cars by Eimco equipment, the cost per ton loaded was cheaper.

Some of the companies have progressed in their mechanization program to a point where one man is loader operator and motorman; and under such conditions the production per man shift is at its maximum. Here are some of the advantages of using Eimco loaders in drawpoint systems of mine production:





- Faster development of area to be mined. It is not necessary to break more than the working area at haulage level to begin production.
- Less labor required. (The customary stope grizzly man is eliminated and the loader operator takes the place of the chute tapper.)

ADING EQUIPMENT AND PRODUCTION

ELECTRIC POWERED

MODEL 12E SPECIFICATIONS

Overall Width (operating) 44%"*	1140 mm
Overall Length (caging) 44"	1120 mm
Overall Length (bucket down) 71"	1805 mm
Headroom Required 781/2"	1995 mm
Clean-up Range 75"	1905 mm
Weight	2250 kilo

Dimensions are for minimum standard machines.

*Applies to 24" (610 mm) gauge track.

The 12E is the small Eimco loader, electric powered. Its overall caging dimensions are increased in width only, to provide room for the extra heavy-duty controls. This machine is available in the same track gauges as the air powered model. Be sure to send electric specifications with order.



MODEL 21E SPECIFICATIONS

Overall Width (operating		
without step plate)	551/4"*	1405 mm
Overall Length (caging)	55"	1400 mm
Overall Length (bucket down)	87"	2210 mm
Headroom Required	88"	2235 mm
Clean-up Range	90"	2290 mm
Weight		3600 kilo

Dimensions are for minimum standard machines.

*Applies to 36" (915 mm) gauge track.

Eimco 21E loaders are medium sized machines for use in medium and large headings. The advantages of electrically operated equipment are particularly important in production loading from drawpoints. Heavyduty controls in explosion proof cases make this unit fast, dependable and efficient.



MODEL 40HE SPECIFICATIONS

Working Length		
(bucket down)	20'81/2"*	6312 mm
Headroom Required	8'0"	2438 mm
Belt Width	28"	711 mm
Cleanup Range	12'†	3657 mm†
D.C. Weight Complete	18,050#	8178 kilo
A.C. Weight Complete	17,850#	8097 kilo

*Standard No. 2 conveyor only. †Without Sideplow

Large, heavy-duty loading machine, the Eimco 40HE is available for operation on AC or DC current. This unit can be equipped with trolley for cleanup or production work and can be worked from cable in development headings.

Narrow width special machines are available on application.



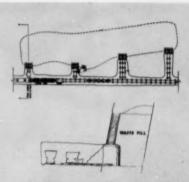
- Initial development cost is less. Chute raises, timbering and grizzly levels are eliminated.
- Lower upkeep. Maintenance on drawpoint is only a fraction of the cost of maintenance on timbered chutes.
- Undercutting stope can start at lower elevation, thus increasing recovery.
- Accident hazards reduced. Grizzly work, freeing chute hang-ups,



APRIL, 1954

- more than 50% of the secondary blasting and train haulage under chutes are eliminated.
- Drawpoints offer better ore storage facilities. Ores tending to pack and hang up can be blasted loose without damage.
- Larger muck can be loaded with an Eimco than would pass through the chute. This provides savings in initial breakage and eliminates a greater percentage of secondary blasting.
- 9. Secondary blasting can be done at the end of the shift. Large





pieces are set off to one side by the Eimco and production loading continues.

 Eliminates the use of powder in haulage-ways and its attendant effects on efficiency and ventilation.

Detailed information will be provided on the practical application of Eimco loaders to production. Eimco engineers will suggest the correct size loading machine and assist in planning the most effective method of mining from drawpoints at your property. No obligation to you.

EIMCO EQUIPMENT METALLURGI



	DRUM	- 50	Q. FT.	FILT	ER AR	EA	
	Face/Lgth.	2'	4'	6'	12'	14'	18'
Dia	m.						
4		25	50	75			
6			75	113	226		
8				150	300	350	
10					376	440	
12					450	527	470

Also available in larger, smaller, intermediate sizes.

Drum Type Eimco Filters feature individual design, deep drainage sections, greater piping and large streamlined valves. Materials of construction are specified for each filter and may be of stainless steel, monel, everdur, mild steel, clad materials, wood, and others with rubber, lead or other protective coverings.



	DI	5C -	5Q.	FT. FIL	TER A	REA	
Disc	. No.	1	2	3	6	10	12
Diam.							
4'0"		.22	44	66	132		
6'0"		.50	100	150	300	500	
8'0"				280	560	930	1115
12'6"	*******				1200	2000	2400

Available in smaller and intermediate sizes not listed.

Eimco Disc Type Continuous Vacuum Filters are available in several designs consistent with slurrie characteristics. Disc sectors are made in either all wood or all metal designs. Materials of construction vary with product to be filtered and local conditions under which machine must operate.



AGIDISC FILTERS

The Agidisc has been successfully employed in the filtration of many heavy, fast settling metallurgical concentrates. It is especially adaptable when particles in suspension may have a comparatively wide range of sizes and the density of feed is low or settling rapid.

SIZES - SAME AS DISC FILTERS ABOVE



FILTERS

The increasing use of Eimco continuous vacuum and pressure filtration units in the metallurgical industries is indicative of the advances in research in the reduction of complex ores, and the corresponding advances in research at Eimco to produce specialized equipment for the Industry. Metallurgical dewatering on standard Eimco equipment, whenever applicable, will always assure the



user of greater production per square foot of filter area, better washing and clearer filtrate than any other similar equipment because Eimco's are designed on a basis of wide experience in the mining and processing indus-

Eimco filters invite comparison with other equipment offered for the same

job. Applications in the complex metallurgical field call for specialized equipment. These are designed in cooperation with customer's engineers after a thorough study of the problems that must be solved to produce the desired product in a specified quantity.

Specialized Eimco equipment is designed with every factor under con-sideration. Eimco's complete research laboratories are available for testing samples of the customer's materials. Research and design engineers with years of practical experience in filtration are available to consult with you on your filtration problems. Every department in the Eimco organization concerned with the production of a specialized filter unit recommends the best, in view of their many years of experience, to set up specifications desirable to the customer. Eimco's complete foundry facilities have been able to solve many problems where special alloys were needed to withstand the customer's operating condi-

FOR DEWATERING CAL SLURRIES

FILTER AREA OF PRECOAT TYPE FILTERS

Length in Feet

6 8 10 12 14 16 2 4 4'0"25 50 75

6'0" 113 150 188

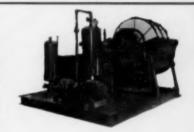
B'O" 200 250 300 350 400

Every Eimco Precoat filter is available for open, vapor tight or pressure tight requirements. Eimco Precoat filters provide the only means of conversion from one type to another in the field without changing the existing unit. Eimco units will give higher filter rates, longer precoat life, better product clarity, longer machine life, fully automatic operation and are more economical.



For sizes available see tables of Drum & Disc type filters. Top feed dewaterers and dryers can also be furnished for this type unit which is particularly adaptable for small units. Units are available for wet or dry vacuum set ups and for single or double solution.

Platform or package type stations are composed of small drum or disc type units mounted on a structural steel subbase with all necessary equipment for the small or pilot plant filter station. Auxiliary equipment consists of: receivers, vacuum pumps, filtrate pumps, blower, motors and piping all wired to a central control panel.



18" Dia. x 12" face

Stainless, monel, lead, iron, steel drum one piece 4 sq. ft. filter area cast. Individual panel covering feature.

DISC

1 Disc 18" 2 sq. ft. 2 Disc 18" 4 sq. ft. Wood or metal disc sectors side caulking feature permitting use of small pieces of filter media.

Eimco stations for Pilot Plant or Laboratory use are specially constructed complete filter plants. These units include all necessary operating equipment for a filter station, compactly assembled on a flat platform or in a cabinet. Materials to specifications. Single or double solution units.



tions; and as a result special heats were made in order to pour special irons or steels to cast the proper grids, panels or valves for the filter unit. Many other factors such as construction material design, selection of numerous attachments and filter media are investigated throughly before actual work is started on the filter unit in the shop.

When the Eimco filter unit reaches its destination, trained Eimco engineers are in attendance to assist or



supervise the assembly in the customer's plant.

Eimco's customers, many of them old friends who have been doing business with us for more than half a century, know Eimco products are the best that can be built. A product of this type, designed to do a specific job is not an item listed in a catalog. Lots of hard work goes into it by both parties; and upon its suc-



cessful operation rests the reputation of the manufacturer.

Experienced operating men know that in cases of this kind an unreliable manufacturer can under-bid any job and throw all the responsibility for success or failure on the customer. That is why more and more of the prominent people in the metallurgical industry are bringing their filtration problems to Eimco — where a filter, correctly designed and built will save many times its price in a few months of operation.



EIMCO EQUIPMENT



EIMCO AIR LOCOMOTIVES

Receiver Size	32 x 84	40 x 84
Width Overall	32"	40"
Height Above Rail	481/2"	481/2"
Wheelbase	30"	30"
Working Pressure, p.s.i	110	110
Approximate Weight		3260#

Eimco Air Locomotives are the only air locomotives with a two speed constant mesh transmission. This feature permits starting the load with maximum power and shifting in motion to high speed for greater speed at less air consumption per foot of travel. All receivers meet A.S.M.E. Code for unfired pressure vessels and each receiver is inspected and serialized.



BALL MILL SPECIFICATIONS

SIZE	OF MILL	R. P. M.	Horsepower	Ball Charge
Dio.	Longth	of Mill	of Motor	in Lbs.
3'	5'	35	25	2600
4'	6'	32	40	5400
5'	6'	28	75	9200
6'	6'	25	125	12000
7'	7'	22	150	21000

NOTE: Sizes shown represent only a few of the mills available.
Write for information.

Eimco cylindrical type ball and rod mills with either central overflow or grate discharge are available in a wide variety of sizes. Any Eimco mill can be converted from central overflow to grate discharge or vice-versa. Eimco mills are extra heavy-duty construction and have many exclusive features.



EIMCO FOLDING SCRAPERS

Sizes 36	42	48	54	60	72
Dimensions					
Length OA 58	58	76	76	95	114
Ht. Open 25	25	35	35	45	51
Ht. Closed 12	12	18	18	26	26
Wt 1hs 560	1445	1675	2000	3775	6025

Eimco Folding Scrapers are heavyduty high capacity scrapers. Folding feature makes scraper require less power on return pull and dig in for full load on every trip. Cast of abrasion and impact resisting alloy steel. Bulletin C3004.

Eimco two speed air locomotives have been used on many construction jobs and in mines. They are particularly popular as gathering locomotives in mines and in contract development drifts because of their rugged construction and low initial cost.



Eimco Ball, Rod or Tube mills are designed for heavy-duty work on a continuous 24 hour basis. Eimco mills have shells rolled from 1" - 11/4" plate steel and heads of cast alloy steel. Bearings furnished with each mill are self aligning type and discharge and feed throat are one piece extending into the mill.

Utaloy liners are furnished with the mill, as extra equipment, when specified. Patterns for liners on all Eimco mills and many other different makes of mills are in stock in our pattern loft and liners when ordered should specify mill size and manufacturer's name and be accompanied by print of liner bolt-hole layout.

Utaloy liners are an abrasion resistant, impact resistant, alloy steel which gives an average of better than 15% longer life under the most difficult conditions.

Eimco folding scrapers are ideal for scram drift operation. These scrapers will dig and bring in a full load every pull. The advantages of this type scraper are in the easy handling and absolute freedom from hangups because of running fingers. They will dig close to the face under the tail sheave and can be easily serviced underground. Quick hitches for both pull and tail ropes eliminate the necessity of rope clamps.



FOR MINE AND MILL

EIMCO AIR MOTOR SPECIFICATIONS

SIZE		Roted HP	Pressure P.S.I.	Speed a
200		71/2	90	950
201	***************	12	90	700
202		17	90	550

All data for reversible type.

Eimco Air Motors are five cylinder radial type motors for reversible or non-reversible service. Heavy-duty construction with special attention to streamlining air passages make the Eimco the most efficient air motor on the market.



EIMCO AIR MOTOR SPECIFICATIONS

MOTOR	200	201	202
Horse Power Rating	7	12.5	17
O.A. Length on Base	231/4"	233/4"	27%"
O.A. Width on Base	151/8"	17"	20%
Approx. Weight	165	250	400

Eimco air motors are five cylinder radial type. They are available flange or pedestal mounted or in a variety of gear reductions with a full range of air motor speed reducer units. Reversible. High torque. Dynamic and static balancing insures smooth operation. Precision made for highest efficiencies.



Eimco air hose is made in sizes of $\frac{1}{2}$ " to 4" inside diameter. Furnished with or without connections. Special chemicals added to natural rubber produce a distinctive golden yellow making hose easily visible.

Eimco Air Hose — extremely flexible wire braid. Neoprene tube that will not collapse. Natural rubber cover treated for resistance to abrasion and impact. Will not sun check. Write for Bulletin H4003.





Air motors are being used for power in many places in preference to internal combustion or electric power when there is an excess of air power available or where steam is being used as power in some part of the plant. The advantages of Eimco air motors on pedestal mounts or with geared heads are numerous. They will start under full load, are instantly reversible, stalling will not damage them, they have a high starting torque, they are absolutely free from

any hazard in the way of ignition by spark, heating or spontaneous combustion.

Users prefer their flexibility in speed and power to a set speed of other types of power.

Eimco air motor units are exceptionally heavy-duty. The geared units are available in a variety of gear ratios which are effective from zero to the rated speed at any given air pressure. Write for complete information.



Eimco air hose is the original wire braid air hose and maintains a quality and user advantage obtainable only by those who did the research and planning to put such a product on the market. Eimco wire braid air hose invites comparison with other "as good as" products for durability, visibility, flexibility and economy. Sizes are from ½" to 4" inclusive in all popular intermediate diameters.



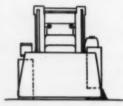
Excavating — Loading — Bulldozing — Pushing — Eimco 105 Unit For Production and Maintenance Around the Mine and Mill





EASY CONTROLS, fast shifting and gear changing without stopping makes for effortless operation.

OSCILLATION, even with the excavating attachment. Provides easy cleanup with the bucket on uneven ground.

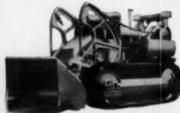


180

INDEPENDENT TRACK OPERATION, an exclusive with Eimcos. One track turns farward, the ether reverse on a turn. Eliminates wear and tear on tracks, eliminates scoring of hard surface reads.



BETTER VISION, the operator sits up front where he can see his work.



The Eimco 105 is a heavy-duty tractor excavator. Weight, approximately 34,000 lbs., bucket capacity 1½-2½ cu. yards.



THE EIMCO CORPORATION
Executive Offices and Factories
Salt Lake City, Utah, U.S.A.

BRANCH SALES AND SERVICE OFFICES
New York, N. Y., 51-52 South Street
Birmingham, Ala., 3140 Fayette Ave.
El Paso, Texas, Mills Building
Chicago—301 So. Hicks Road, Palatine, Ill.
Duluth, Minn., 216 E. Superior Street
Kellogg, Idaho, 307 Division Street
Kellogg, Idaho, 307 Division Street
San Francisco—637 Cedar St., Berkeley, Cal.
London W. 1, England, 190 Piccadilly
France: Societe Eimco, Paris, France
Italy: Eimco Italia, S. P. A., Milan, Italy

HOW TO USE

Pre-Filed Catalog Section
The Buyer's Guide For
Mine-Mill-Smelter Equipment

USE THIS CARD TO WRITE TO THE MANUFACTURER DIRECT

> Postage Řeguired

- ▶ Keep the catalog section on your desk for ready reference.
- ➤ To find the manufacturer of a specific product: Look under the product heading in Section I of the yellow pages. All principal manufacturers of specialized minemill-smelter equipment are listed.
- Next, refer to the manufacturer's catalog or advertisement for further product description. Advertisers are listed in bold face type.
- For complete information on any product, fill-out the attached postage cards.
- The names and addresses of manufacturers are listed alphabetically in Section II of the yellow pages.

These two cards
are addressed to
Mining World. List the
information you want—
WE'LL DO THE REST.
No postage necessary
if mailed in U. S.

Read the advertisements. They give you the latest information on mining equipment.

GENTLEMEN:

Please send me FREE information on your equipment as advertised and indexed on page in MINING WORLD's 1954 Annual Catalog Issue, Development and Directory Number.

MINING WORLD-WORLD MINING CATALOG SERVICE

MINING WORLD-WORLD MINING CATALOG SERVICE

MINING WORLD PRODUCT EDITOR:

Please send me FREE information on the equipment advertised and indexed on:

Page: Product: Mfr:

Name: Title:
Company:

MINING WORLD-WORLD MINING CATALOG SERVICE

MINING WORLD PRODUCT EDITOR.

Please send me FREE information on the equipment advertised and indexed on:

THESE CARDS ARE SIMPLE TO USE. THE OTHER SIDE TELLS YOU HOW!

USE THESE CARDS

To get FREE up-to-date information on the newest in mine-mill-smelter equipment

Place Stamp Here

Section I of the vellow pages is your product index

Section II of the yellow pages lists alphabetically all principal manufacturers of specialized mining equipment and their addresses.

Keep this catalog section on your want to refer to it often

desk for ready reference. You will

Further information on any product advertised is available. Mail these two cards today. We will forward your request to the manufacturer immediately

FREE INFORMATION



To:



BUSINESS REPLY CARD

MINING WORLD—WORLD MINING

121 SECOND STREET SAN FRANCISCO 5, CALIFORNIA

U. S. A.



ostage Stamp Necessary If Mailed in the United State

BUSINESS REPLY CARD

MINING WORLD-WORLD MINING 121 SECOND STREET SAN FRANCISCO 5, CALIFORNIA

U. S. A.

1954 MINING WORLD-WORLD MINING

Catalog Index

Equipment and Manufacturers

The CATALOG INDEX is comprised of two sections:

SECTION I is an alphabetical listing of the specialized products and equipment used by the MINE-MILL-SMELTER industry. All principal manufacturers of these products and equipment are listed for your convenience.

SECTION II is an alphabetical list of all principal manufacturers and their addresses.

The names of manufacturers who are represented in

this issue by catalogs or advertisements are printed in BOLDFACE type in Sections I and II. The page numbers of their catalogs or advertisements are also given for easy reference.

Every effort has been made to make your MINING WORLD-WORLD MINING CATALOG ISSUE, Development and Directory Number as complete and accurate as possible. MINING WORLD, however, cannot be responsible for changes in names, addresses, and other discrepancies.

SECTION I

Equipment Index

SECTION I contains an alphabetical list of product and equipment names. Wherever feasible, equipment has been indexed under headings representing the nomenclature preferred by the industry; or in many cases under the principal proper noun. For example,

"Flotation Machines" are indexed as such rather than under the all-encompassing heading "Machines." Rock Drills, however, have been most logically listed as "Drills, Rock."

ACETYLENE

See Welding Equipment, Supplies, and Services

See Reagents and Chemicals

ACTUATORS

See Cylinders and Actuators

AGITATORS AND CONDITIONERS

Black, Sivalis & Bryson, Inc. Booth Engineers Caldwell Co., W.E. Christian Engineers, J.D. Denver Equipment Co., Cataloged on page 7 page 7
Denver Super—see Denver Equipment Co.
Dorr Co., The, Cataloged on page 12
General American Transportation General American Transportation
Corp.
Bardinge Co., Inc., Cataloged on
page 97 & 162
Hirsch Bros. Machinery Co.
Mineral Foundry & Mfg. Co.
Minerals et Metaux, Cataloged on
page WM 24, World Mining Only
Morse Bros. Machinery Co.
Process Engineering Inc.
Rite-Lo-Speed—see Christian Enginers, J.D.
Stearns Roger Mfg. Co., Cataloged

neers, J.D. Stearns Roger Mfg. Co., Cataloged on page 214

Straub Mfg. Co., Inc.
Telluride Iron Works Co.
U.S. Hoffman Machinery Corp.
Wemco-see Weatern Machinery Co.
Western Gear Works, Pacific Gear
Plant
Western Machinery Co., Cataloged
on page Inside Back Cover

AIR DRIVEN TOOLS

See Tools, Air Driven

AIR LEG

Chicago Pneumatic Tool Co.
Copco Pacific, Ltd., Cataloged on
page 53
Gardaer-Denver Co., Cataloged on
page 16
Ingersoll-Rand Co., Cataloged on
page 258-251
Joy Manufacturing Co., Cataloged
on page 225-246
Le Roi Co., Cataloged on page 248Thor—see Thor Power Tool Co. Thor—see Thor Power Tool Co.
Thor Power Tool Co., Cataloged on
page WM 22, World Mining Only

AMALGAMATORS

Denver Equipment Co., Cataloged on page 7
Gibson, W.W.
Mill & Mine Supply, Inc.
Mine & Smelter Supply Co., The,
Cataloged on page 284-285
Miners Foundry & Mfg. Co.,
Pacific Coast Engineering Co.
Recoveries, Inc.
Straub Mfg. Co., Inc.

ARMS AND POSTS

PNEUMATIC PNEUMATIC
Gardner-Denver Co., Cataloged en
page 18
Ingersoil-Rand Co., Cataloged en
page 250-251
Thor—see Thor Power Tool Co.
Thor Power Tool Co., Cataloged en
page WM 22, World Mining Only

MECHANICAL Gardner-Denver Gardner-Denver Co., Cataloged on page 16 Ingersoli-Rand Co., Cataloged en page 259-251

ASSAY SUPPLIES

See Laboratory Equipment and Supplies

ASSAYERS See Laboratories

AUGERS See Drills; Bits

BAGS

FILTER BAGS Bemia Bros. Bay. Co., Cataloged on page 85 Convair, Inc. Eimeo Cerp., The, Cataloged on page 297-394 National Filter Media Corp.

Norhlo-see Northern Blower Co., The Northern Blower Corp., The, Cata-loged on page 96 Pendleton Woolen Mills Portland Woolen Mills Plummer Mfg., W.A. Winslow Engineering Co., Catalog-d on page 62

ORE AND CONCENTRATE BAGS
Bemis Bros. Bag Co., Cataloged on
page 56
Central Mine Supply Co.
Plummer Mfg. Co., W.A.

SAMPLE BAGS SAMPLE BAGS
Bemis Bros. Bag Co., Cataloged on
page 86
DFC—see Denver Fire Clay Co., The
Denver Fire Clay Co., The, Cataloged on page 286
Hammond Bag & Paper Co.
Wellsburg, W. Va.
Plummer Mfg. Co., W.A.
Tamping Bag Co., The
Union Bag & Paper Co.

BALL MILLS

See Grinding Equipment

BALLS

See Grinding Equipment

The, Cataloged on BARRELS, CORING

See Drills

BATTERIES

See also Safety Equipment AUTOMOTIVE AND LIGHT PLANT tric Storage Battery Co., the Exide Industrial Div. es Rubber Co., Cataloged on page 29 Gould-National Batteries, Inc. Ray-O-Vac Co.

LOCOMOTIVE C & D Batteries, Inc.
Edison—see Edison, Inc., Thomas A.
Edison, Inc. Thomas A.
Electric Storage Battery Co., The,
Exide Industrial Div.
Gould-National Batteries, Inc.

BATTERY CHARGERS

See Chargers, Battery

BELL SYSTEMS

See Communications

BELTS AND BELTING

See also Conveyor Equipment; Fasteners, Belts, Safety Equip-

CHAIN, LINK AND METAL American Brake Shoe Co. American Brake Shoe Co. American Manganese Steel Div. Amsco—see American Brake Shue

Manganose Steel Div.

Manganose American Brake Shue
Co.

American Chain & Cable Co., Inc.
American Chain Div.
Baldwin-Rex—see Chain Belt Co.
Bodinson Mfg. Co.
Bodinson Mfg. Co.
Bodinson Mfg. Co.
Bodinson Mfg. Co.
Colorade Fuel & Iron Corp., The.
Cataloged on page 28A, 216, 211
Continental Gin Co., Industrial Div.
Conveyor Co., The.
Cullman Wheel Co.
Dodge Manufacturing Corp.
Helmick Foundry-Machine Co.
Hewitt-Robins Inc. Korb-Fettit Wire
Fabrics & Iron Works, Inc., a
substidiary
Lisk-Belt—see Link-Belt Co.
Link-Belt Co. Cataloged on page
WM 76,77 (World Mining Only)
Falmer-Bee Co.
Rex—see Chain Belt Co.
Taylor-Wharton Iron & Steel Co.
Webb Corp., The
Yuba Manafacturing Co., Cataloged
on page 75
Wissco-see Colorado Fuel & Iron
Corp. Wissco Corp.

LEATHER BELTING

Cordon—see Sikes Co., S. R.
Duxbak—Schleren Co., Chas. A.
Fisher Kanghurt—see Fisher Leather Belting Co., Inc., The
Fisher Leather Belting Co., Inc.,
The
Gates Rubber Co., Cataloged on Gates Rubber Co., Cataloged on page 28
Hewitt Robins Inc.
Houghton & Co., E. F.
Mine & Smelter Supply Co., The
Marcy Mill Div., Cataloged on
pages 284-385
New York Belting & Packing Co.
Raniville Co., F.
Rhoads & Son, J. E.
Schieren Co., Chas. A.
Sikes Co., B. R.
Tannate—see Rhoads & Son, J. E.
Ton-Tex Corp.
Webb Belting & Supply Co.
Webb Corp., The
William & Sons, I. B.
RUBBER BELTING

William & Sons, I. B.

RUBBER BELTING

Flut Belts

Ajax—see Hewitt-Robins, Inc.
American Rubber Mfg. Co.
Barber-Greene Company, Cataloged
on page 76

Bear—see American Rubber Mfg.
Co.
Coston Woven Hose & Rubber Co.
Carlyle Rubber Co., Inc.
Challenger—see Lee Rubber & Tire
Cerp., Republic Rubber Div.
Conservo—see Hewitt-Robins, Inc.
Cordan—see Sikes Co., S. R.
Crackerjack—see American Rubber
Mfg. Co.
Dick Co., R. & J.
Fenwick Manufacturing Co.
Goedall Rubber Co., Cataloged en
pages 216-217

Goodrich Co.
Goodycar Tire & Rubber Co.
Hewitt-Robins, Inc.
Havader—see Lee Rubber & Tire
Corp., Republic Rubber Div.
Iwana—see Fenwick Manufacturing

Co.

Kablo Kord—see New York Belting
& Packing Co.

Lee Rubber & Tire Corp., Republic
Rubber Div., Cataloged on page 218

se Cross-see Hewitt-Robins, Maltese Cross—see Hewitt-Robins, Inc.
New York Belting & Packing Co.
Pioneer Rubber Mills
Quaker Rubber Co.
Raniville Co., F.
Raybestoo-Manhattan, Inc.
Republic Rubber Div., Lee Rubber
& Tire Corp., Cataloged on page
251

a fire Corp., Cataloged on page 218
Sikes Co., S. R.
Snyder & Son, Inc., M. L.
Test Special—see New York Belting & Packing Co.
Thermoid Ce., Cataloged on page 24
Timing—see New York Belting & Packing Co.
Ton-Tex Corp.
United States Rubber Co.
Webb Belting & Supply Co.
Webb Corp., The
Williams & Son, I. B.
Yosemite—see American
Mfg. Co.

RUBBER BELTING V-Belts

Allis-Chalmers Mfg Co., Gen. Mach. Div., Cataloged on pages 9, 289-296 Div., Cataloged on pages 9, 338-348
Boston Woven Hose & Rubber Co. Carlyle Rubber Co., Inc., Champion—see Lee Rubber & Tire Corp., Republic Rubber Div. Conveyor Co., The Cordan—see Sikes Co., S. R. Dayton Rubber Co., Dick Co., R. & J. Dodge Manufacturing Corp. Flexible Steel Lacing Co. Gates Rubber Co., Cataloged on page 20
Gilmer—see New York Belting & Packing Co.
Goodrich Co., B. F. Goodyear Tire & Rubber Co., Hamilton Rubber Mfg. Corp. Lee Rubber & Tire Corp., Republic Rubber Div., Cataloged on page 118
Link-Belt—see Link-Belt Co.

Rubber Div., Cataloged on page 114 ink-Belt—see Link-Belt Co., Ink-Belt
218
Shippert Manufacturing Co.
Slices Co., S. R.
Thermoid Co., Cataloged on page 24
Ton-Tex Corp.
United States Rubber Co.
Veclos—see Manheim Mfg. & Belting Co.
Webb Belting & Supply Co.
Webb Corp., The
Williams & Sons, I. B.
Worthington Corp.

BINS, CHUTES & ACCESSORIES

San also Feeders BINS AND CHUTES

Ajax Flexible Coupling Co. American Brake Shoe Co. American Steel Dredge Co., Inc. Amsco—see American Brake Sh

Amsco—see American Brake Shoe Co.
Barber-Greene Co., Cataloged on page 76
Bethlehem Steel Co.
Bodinson Mfg. Co.
Caldwell Co., W. E.
Coeur d'Alene Hardware & Foundry Columbian Steel Tank Co., Cataloged on page 66
Connellsville Mfg. & Mine Supply

Concarir, Inc.
Conveyor Co., The
Denver Equipment Co., Cataloged
on page ?

Diamond Iron Works Co.
Dresser-Stacey Co.
Stacey Bros. Div.
General American Transportation
Corp.
Graver Tank & Mfg. Co., Inc.
Hales Co., W. M.
Helmick Foundry-Machine Co.
Hewitt-Robins Inc.
Robins Conveyors Div.
Heyl & Patterson, Inc.
Hirsch Bros. Machinery Co.
Hockensmith Corp., The
Holmes & Bros., Inc., Robert
Hydraulic Supply Mfg. Co.
Iowa Manufacturing Co., Cataloged
on page 197
Jeffrey Manufacturing Co., The,
Cataloged on page 252
Kirk & Bium Mfg. Co., The
Koehring Co., Johnson Co., C. S.,
a Subsid.
Lakeside Bridge & Steel Co.
Link-Belt—see Link-Belt Co.
Link-Belt—see Link-Belt Co.
Link-Belt Co., Cataloged on page
WM 18-17 (World Mining Only)
Lippmann Engineering Works
Marco—see Marsh Engineering Co.,
E. F.

wM 74-77 (World Mining Only)
Lippmann Engineering Works
Marco—see Marsh Engineering Co.,
E. F.
Marsh Engineering Co., E. F.
Miners Foundry & Mfg. Co.
Palmer-Bee Co.
Philips Mine & Mill Supply Co.
Plouseer Engineering Works, Inc.,
Cataloged on page 200
Process Engineering Inc.
Remaily Mfg. Co.
Rogers Iron Works
Sanford-Day Iron Works, Inc.
Smith Engineering Works
Stephens-Adamson Mfg. Co., Cataloged on page 202
Taylor-Wharton Iron & Steel Co.
Telluride Iron Works Co.
United States Steel Co., Cataloged
on page 28, 265-268
Universal Engineering Corp.
Watt Car & Wheel Co., The
Webb Corp., The
GATES, LIPS, ETC. Lippmann Engineering Works Marco-see Marsh Engineering Co.,

GATES, LIPS, ETC.

American Brake Shoe Co.,

American Steel Dredge Co., Inc.

Amsco-see American Brake Shoe Bodinson Mfg. Co. Coeur d'Alene Hardware & Foundry

Bodings.
Court d'Alene Hardware
Co.
Connellaville Mfg. & Mine Supply
Co.
Convair, Inc.
Conveyor Co., The
Denver Equipment Co., Cataloged on
page 7

Conveyor Co., The
Denver Equipment Co., Cataloged on
page 7
Hales Co., W. M.
Helmick Foundry-Machine Co.
Hewitt-Robins Inc.
Hirsch Bros. Machinery Co.
Holmes & Bros., Inc., Robert
lows Manufacturing Co., Cataloged
on page 197
Jeffrey Manufacturing Co., Cataloged
on page 197
Link-Bett Co.
(Johnson co., C. S. a subsid.)
Link-Bett Co., Cataloged on page
WM 76, 77 (World Mining
Colly)
Lipmann Engineering Works
Marco—ace Marsh Engineering Co.,
E. F.
Marsh Engineering Co., E. F.
Miners Foundry & Mfg. Co.
Palmer-Bee Co.
Palmer-Bee Co.
Stephens-Adamson Mfg. Co., Cataloged on page 292
Straub Mfg. Co., Inc.,
Cataloged on page 292
Straub Mfg. Co., Inc.
Taylor-Wharton Iron & Steel Co.
Telluride Iron Works Co.
Webb Corp., The
INDICATORS

INDICATORS

Bin-Dicator see Bin-Dicator Co., Bin-Dicator—see Bin-Dicator Co.,
The
Bin-Dicator Co., The
Convair, Inc.
Conveyor Co., The
Denver Equipment Co., Cataloged
sus page 7
General Equipment & Mfg. Co.,
Jeffrey Manufacturing Co.,
The,
Cataloged on page 252
Jeffrey-Taylor—see Jeffrey Manufacturing Co., The
Koehring Co., Johnson Co., C. S.
a subsid.
Stephens-Adamsen Mfg. Co., Cataloged on page 262
Webb Corp., The

VIBRATORS Bin-Dicator Co., The

Bin-Flow—see Bin-Dicator Co., The Bodinson Mfg. Co. Cleveland Vibrator Co., The Convair, Inc.
Denver Equipment Co., Cataloged on page 7
Jeffrey Manufacturing Co., The, Cataloged on page 252
Jeffrey-Taylor—see Jeffrey Manufacturing Co., The Lippmann Engineering Works Martin Engineering Co. Rotary Silent—see Martin Engineering Co. Rotary Silent are found in the control of the contr

BITS

See also Steel

AUGER BITS

Bowdill Co., The Bowdill Co., The
Cardox Corp.
Central Mine Equipment Co.
Coalmaster—see Central Mine
Equipment Co.
Firth Sterling Inc.
Firthite—see Firth Sterling Inc.
Gardner-Denver Co., Cataloged on
page 125-246
General Electric Co., Carboloy Dept.
Joy Manufacturing Co., cataloged
on page 225-246
Kennametal—see Kennametal Inc.
Kennametal Inc.
Kerfmaster—see Central Mine Kennametal—see Kennametal Inc.
Kennametal Inc.
Kernametal Inc.
Kerfmanter—see Central Mine
Equipment Co.
The
Lectonia—see Lectonia Tool Co.,
The
Lectonia Tool Co., The
Manitoba Steel Foundries Ltd.
Mobile Drilling Inc.
Pennsylvania Drilling Co.
Salem—see Salem Tool Co., The
Salem Tool Co., The, Cataloged on
page 99
Vascoloy-Ramet Corp.

CHURN BITS

Acme Fishing Tool Co.
Bucyrus-Erie Co.
General Electric Co., Carboloy Dept.
Mill Iron Works, Inc.
Mobile Drilling, Inc.
Mobile Drilling, Inc.
Standerson Cyclone Drill Co.
Stardrill-Keystone Co.
SuPerLoy-see Banderson Cyclone
Drill Co.

DIAMOND BITS

Acker Drill Co.,
page 72
American Coldset Corp.
American Diamond Drill Co.
Ascolite—see Bmit & Co., Inc.,
Anton
Boyles Bros. Drilling Co., Cataloged
on page 25
Boyles Bros. Drilling Co., Ltd.
(Canada) Cataloged on page
WM 18 (World Mining Only)
Bronzolite—see Smit & Co., Inc.,
Anton Acker Drill Co., Inc., Cataloged on

Anton
Anton
Champion Diamond Co.
Christensen Diamond Products Co.,
Cataloged on page 253-260
Diamond Drill Carbon Co., The
General Electric Co., Carboloy Dept.
Hard-Hed—see Smit & Sons, Inc.,
J. E.

General Electric Co., Carboloy Dept.
Hard-Hed-see Smit & Sons. Inc.,
J. K.
Havlick Diamond Drilling Co., Inc.
Koebel Diamond Tool Co.
Impregnalite-see Smit & Co., Inc.,
Anton
Joy Manufacturing Co., Cataloged
on page 215-240
Longyeer Co., E. J.
McClinteck Co., R. S., Cataloged
on page 119
Mobile Drilling, Inc.
Mott Core Drilling, Co.
Nicolite-see Smit & Co., Inc.,
Antan
Pennsylvania Drilling Co.
Permaset-see Boyles Bros. Drilling
Rosset-see Sprague & Henwood.

Rosset—see Sprague & Henwood.
Inc.
Smit & Co., Inc., Anton, Cataloged
on page 47
Smit & Sona, Inc., J. K.
Sprague & Henwood, Inc., Cataloged
on page 221-224
Tufset—see Sprague & Henwood.
Inc.,
Trucast—see Sprague & Henwood.
Inc.,
Truco—see Wheel Trusing Tool Co.
Wheel Trusing Tool Co., Cataloged
on page 225A-226A

MINING WORLD

PERCUSSION BITS

PERCUSSION BITS

Acme Fishing Tool Co.
Brunner & Lay Companies
Copes Pacific, Ltd., Cataloged on
page 53
Gardner-Denver Co., Cataloged on
page 16
General Electric Co.—Carboloy Dept.
Holman Bros. Ltd.
Holman Brothers (Canada) Ltd.
Ingersoll-Rand Co., Cataloged on
page 256-251
Joy Manufacturing Co., Cataloged
on page 225-240
Kennametal—see Kennametal Inc.
Kennametal—Inc. Minerals Engineering Co. (Grand
Junction, Colo.)

Minerals Engineering Co. (Grand Junction, Colo.) Mobile Drilling, Inc. Rok Bita—see Brunner & Lay Com-

Rok Bita and panies panies Stardrill-Keystone Co. Ther Power Tool Co., Cataloged on page WM 22 (World Mining

Only)
Throwaway Bit Corp.
Timken—see Thor Power Tool Co.
Timken Roller Bearing Co., The
Cataloged on page 215
Western Rock Bit Manufacturing
Co., Cataloged on page 58

ROTARY BITS
Central Mine Equipment Co.
Coalmaster—see Central Mine Equip-Central
Coalmaster—see Con...
ment Co.
Firth Sterling Inc.
Firthite—see Firth Sterling, Inc.
Firthite—see Firth Sterling, Inc.
Gemeo Tru-Blu—see Gibraitar
Equipment & Mfg. Co.
General Electric Co., Carboloy Dept.
Gibraitar Equipment & Mfg. Co.
Hawthorne, Inc., Herb J.
Tool Co.
Tool Co., Cataloged

Gibraltar ropon.
Hawthorne, Inc., Herb J.
Hawthorne, Inc., Herb J.
Hughes Tool Co.
Joy Manufacturing Co., Cataloged
on page 225-240
Central Mine Kerfmaster—see Cen Equipment Co. Mobile Drilling, Inc. Vascoloy-Ramet Corp. Winter Weiss Co., The

BLASTING SUPPLIES

EXPLOSIVES

American Cyanamid Co., Cataloged on page 123 Apache Powder Co. Atlas Powder Co. Du Pont de Nemours & Co., Inc., E. I. E. I.
Hercules Powder Co.
Illinois Powder Mfg. Co.
National Powder Co.
Olin Industries, Inc., Explosives

Div Trojan Powder Co.

ACCESSORIES—other than above
American Cyanamid Co., Explosive
Dept.
Atlas Powder Co.
Central Mines Supply Co.
Coast Mig. & Supply Co.
Davis Instrument Mig. Co., Inc.
Du Pont de Nemours & Co., Inc.,
E. I.

Da Pont de Nemours & Co., Inc.,
Economy Fuse & Mfg. Co.
Economy Fuse & Mfg. Co.
Emsign-Bickford Co.
Pulton Bag & Cotton Mills, Inc.
Gray Instrument Co.
Fried Fowler Co.
Formal Co.
Fried Fowler Co.
Supplies, G. R.
Lowell Insulated Wire Division
Mine Safety Appliances Co., Cataloged on page 95
Minnesota Mining & Mfg. Co. Irvington Varnish & Insulator
National Fuse & Pewder Co., Cataloged on page 64
National Mine Service Co.
National Powder Co.
Olin Industries, Inc., Explosive Dept.
Permi-Seal—see National Mine Service Co.
Primacord—see Ensign-Bickford Co.
Quick-Seal—see National Mine Service Co.
Tamping Bag Co., The
Trojan Powder Co.
Westinghouse Electric Corp.

BLOCKS & SHEAVES

See also Conveyor Equipment

Allis-Chaimers Mfg. Co., Gen. Machy. Div., Cataloged on page 5, 235-236 Alloy Steel & Motals Co., Cataloged on page 6 American Brake Shoe Co. American Hoist & Derrick Co.

-see American Brake Shoe

American Brake Bnoe Co. Anvil—see Western Block Co. Bodinson Mfg. Co. Card Iron Works Co., The C. S., Cataloged on page 248-247 Connellsville Mfg. & Mine Supply

Co.
Dobbie Foundry & Machine Co.
Dodge Manufacturing Corp.
Durolite-see Sauerman Bros., Inc.
Hockensmith Corp., The
Holmes & Bros., Inc., Robert
Hyman-Michaels Co. lyman-Michaels Co.
ohnson Block Co.
ones Foundry & Machine Co., W. A.
oy Manufacturing Co., Cataloged
on page 225-240
cenney Co., Paul E.
acific—see Alloy Steel & Metals

Pacific—see Alloy Dee. Co.

Round & Sons, Inc., David
SKF Industries, Inc.
Sanford-Day Iron Works, Inc.
Sauerman Bros., Inc., Cataloged on
page 208
Skookum Co.
Taylor-Wharton Iron & Steel Co.
Tool Steel Gear & Pinion Co., The
Vulcan Iron Works, Pa.
Western Block Co.
Vuha Manufacturing Co., Cataloged Vulcan Hock Co. Western Block Co. Yuba Manufacturing Co., Cataloged on page 79

BLOWERS

See Ventilation Equipment and Blowers

BODIES

See Trucks and Trailers; Mine Cars

BOLTS, ROCK

Bethlehem Pacific Coast Steel Corp.
Bethlehem Steel Co.
Cf&l-see Colorado Fuel & Iron
Corp., The
Colorado Fuel & Iron Corp., The
Cataleged on page 28A, 210-211
Duquesne Mine Supply Co.
Elreco Corp., The
Lamson—see Lamson & Sessions
Co., The
Lamson & Sessions Co., The
Ohio Brass Co.
Oliver Iron & Steel Corp.
Pacific Car & Foundry Co.
Pressed Steel Car Co., Inc., Cataloged on page WM 90 (World
Mining Only)
Republic—see Republic Steel Corp.
Republic Steel Corp.

BORTZ

See Diamonds, Industrial

BOOM ASSEMBLIES

See Drills; Excavators and

BUCKETS

See Hoisting Equipment: Tramways, Aerial; Dredges and Dredge Buckets; Conveyor

BUILDINGS, METAL

ied Steel Products Corp. Page 118
Aluminum Co. of America
Armeo Drainage & Metal Products,
Inc.
Bethlehem Steel Co.
Blaw-Knox Co., Blaw-Knox Div.
Butler Mfg. Co.
Columbian Steel Tank Co., Cataloged on page 66
Gregg Co., Ltd., The, Cataloged on page WM 20-21 (World Mining Only) Page 118

Ideco—see Ideco Div., Dresser-Stacey Co.
Co.
Ideco Div., Dresser-Stacey Co.
Klockner-Humboldt-Deuts Ag.
Luria Engineering Co.
Maryland Metal Building Co., Inc.
Republic Steel Corp., Truscon Steel
Div.

Div.
Steelcraft—see Steelcraft Manufac-turing Co., The
Steelcraft Manufacturing Co., The
U. S. Steel Corp., American Bridge

Div.
United States Steel Export Co.,
Cataloged on page 265-268
Webb Corp., The

BULLDOZERS

See Tractors and Attachments

BURNERS, OIL & GAS

Babcock & Wilcox Co.
DFC—see Denver Fire Clay Co., The
Denver Fire Clay Co., The, Cataloged
on page 286
Diamond Iron Works Co.
Enco—see Engineer Co., The
Engineer Co., The
Hauck Manufacturing Co.
Mahr Mfg. Co.
Mine & Smelter Supply Co., The
National Airoll Burner Co.
Northern American Manufacturing
Co., The
Victor Equipment Co.

BUYERS OF ORES AND CONCENTRATES

"Possible Markets Ores, Metals and Nonmetallics" page 120

CABLE AND CONDUIT

See also Rope, Wire; Tramway,

ELECTRICAL CABLE AND CONDUIT

Aluminum Co. of America
American Mine Door Company,
Cataloged on page 212
Anaconda Wire & Cable Co., Cataloged on page 219
Ankoseal—The Ansonia Wire &
Cable Company
Ansonia Wire & Cable Company,
The
Bridgeport Resear Co.

Ansonia Wire & Cable Company,
The
Bridgeport Brass Co.
Canada Wire & Cable Co., Ltd.
Chase Brass & Copper Co.
Collyer Insulated Wire Co.
Essex Wire Corp., Paranite Wire
and Cable Div.
Flex-A-Power—see General Electric
Co.
G & W Electric Specialty Co.
General Cable Corp.
General Electric Co.
General Electric Co., Construction
Materials Dept.
Graybar Electric Co., Inc.
Hazacord—see Hazard
Wire Works Div., Okonite Co.
Indestructo—see National Electric
Products Corp.

Wire Works Div., Okonite Co.
Indestructo—see National Electric
Products Corp.
International General Electric Co.
Johns-Manville
K/W—see Kaiser Aluminum & Chemical Corp.
Kaiser Aluminum & Chemical Corp.
Karite Co., The
Lowell Insulated Wire Division
Metal & Thermite Corp.
Mine & Smelter Supply Co., The,
Marcy Mill Division, Cataloged
on page 284-285
Minnesota Mining & Mfg. Co., Irvington Varnish & Insulator,
Division

ington Division

Division
National Electric Products Corp.
National Supply Co., The
Okonite Company, Hasard Insulated
Wire Works
Paranite—see Essex Wire Corp.,
Paranite Wire and Cable Div,
Phelps Dodge Copper Products
Corp., Habirshaw Cable & Wire
Republic Steel Corp.

Manufacturer's Complete Names and Addresses are listed in Section II, last pages of this yellow section.

Roebling's Sons Corp., John A.
Rockbestos Products Corp.
Rome Cable Corp.
Rome 60—see Rome Cable Corp.
Saylor Electric Products Corp.
Sherarduct—see National Electric
Products Corp.
Simplex Wire & Cable Co., Cataloged
on page 18, 19
Spang—see National Supply Co., The
Transite—see Johns-Manville
U. S. Steel Corp., American Steel
& Wire Div.
United States Steel Export Co.,
Cataloged on page 265-265
United States Rubber Co.
Western Insulated Wire Co.
Xduct—see National Electric Products Corp.

CABLEWAYS, EXCAVATING

See Excavators

CAGES

See Hoisting Equipment

CALCINERS

See Dryers and Kilns; Pyrometallurigcal Equipment

CAPS

See Blasting Supplies

CARBIDE

CALCIUM—See also Tungsten
Carbide Products

Air Reduction Sales Co.
Industrial Air Products Co.
Monsanto Chemical Co.
National Cylinder Gas Co.
Union Carbide & Carbon Corp.—
Linde Air Products Co.

CARS, MINE

See also Haviage Units, Off-rail

See also Haulage Units, Off-reil
Allison Steel Mfg. Co., Cataloged
on page 118
American Car & Foundry Co.
American Steel Dredge Co., Inc.
Allas Car & Mfg. Co., The, Cataloged on page 218
Baker-Raulang Co.—Industrial Truck
Div.
Baldwin - Lima - Hamilton Corp.,
Cataloged on page 16
Bethlehem Pacific Coast Steel Corp.
Co.
Codinson Mfg. Co.
Brown-Fayro Co., The, C. S.,
Cataloged on page 245-246
Coeur d'Alene Hardware & Foundry
Co.
Crichton Co.
Denver Equipment Co., Cataloged on page 51
Differential Steel Car Co., Cataloged on page 51
Easton—see Easton Car & Construction Co.
Emico Corp., The, Cataloged on page 297-394
Enterprise Wheel & Car Corp.
Gemoo Tru-Blu—see Gibraltar
Equipment & Mfg. Co.
Getman Brothers
General Electric Co.
Gibraltar Equipment & Mfg. Co.
Gregg—see Gregg Co., Lid., The,
Gregg Co., Lid., The, Cataloged on page 200, Co.
Hirach Bros. Machinery Co.
Hockensmith Corp., The
Hyman-Michaels Co.
Irwin Foundry & Mine Car Co.
Jeffrey Mfg. Co., Cataloged on page 252
Kerrigan Iron Works, Inc.
Kilbourne & Jacobs Mfg. Co.
Lake Shore Engr.

Steel Castings Co.

National Malleable & Steel Castings
Co., Cataloged on page 1
Neal Machinery Co., H. T.
Ogden Iron Works Co.
Pacific Car & Foundry Co.
Phillips Mine & Mill Supply Co.
Phillips Mine & Mill Supply Co.
Phillips Mine & Mill Supply Co.
Pressed Steel Car Co., Inc., Cataloged on page WM 98 (World Mining Only)
Provo Foundry & Machine Co.
Sanford-Day Iron Works Inc.
Telluride Iron Works Co.
Union Iron Works
United States Steel Corporation,
Cataloged on page 26, 285-268
U. S. S.—see United States Steel
Corporation
United States Steel Export Co.,
Cataloged on page 26, 265-268
Watt Car & Wheel Co., The
Webb Corp., The

CAR PASSERS

American Mine Door Company, Cataloged on page 212 Canton—see American Mine Deur Company

CAR SHAKERS

See Shakers, Car

CELLS, FLOTATION

See Flotation Machines

CHAIN AND ACCESSORIES

American Brake Shoe Co. American Chain & Cable Co., Inc., American Chain Div. American Brake Shoe

Co. Boston Gear Works Bowdill Co., The Chain Belt Co., Baldwin-Duckworth

Chain Belt Co., Baldwin-Duckworth Div.
Clarkson Mfg. Co., Cataloged on page 110
Continental Gin Co.
Electric Steel Foundry Co.
Jeffrey Manufacturing Co., The,
Cataloged on page 252
Kensington Steel Co.
Laughlin Co., The Thomas
Link-Belt—ace Link-Belt Co.
Link-Belt—ace Link-Belt Co.
Classington Only)
Redbird—ace Clarkson Mfg. Co.
Round—ace Round Woodhouse

eee Clarkson Mfg. Co Redbird—see Clarkson Mfg. Co.
Round—see Round Woodhouse
Chain & Mfg. Co.
Round Chain Cos.
Round Woodhouse Chain & Mfg. Co.
Ryerson & Bon, Inc., Joseph T.
Taylor-Wharton Iron & Steel Co.
Webb Corp., The
Webster Mfg., Inc.
Wilmot Engineering Co.

CHAIN HOISTS

Coffing Hoist Co.
Yale and Towne Mfg. Co., Materials
Handling Division

CHARGERS, BATTERY

Baldor—see Baldor Electric Co.
Baldor Electric Co.
Baldor Electric Co.
Calch—see Clark Electronic Corp.
Charg-O-Matle—see Hertner Electric Co.
The Clark Electronic Corp.
Electrical Facilities Inc.
Electric Facilities Inc.
Electric Facilities Inc.
Electric Facilities Inc.
Electric Buorage Battery Co., The,
Exide Industrial Div.
Exide Industrial Div.
Fairbanks, Morse & Co.
General Electric Co.
Georator Corp.
Goodman Manufacturing Company,
Mancha Storage Battery Lecomotive Division
Gould-National Batteries, Inc.
Hertner Electric Co., The
Inet Division of Leach Corp.
Interpational General Electric Co.,
Cataloged on Inside Frent Cever
(Werld Mining Only)
Ironton Engine Co., The
Kato Engineering Co.
Kuirs & Root Co.

Lister-Blackstone, Inc.
Motor Generator Corp.
Novo Engine Co.
Onan & Sons, Inc., D. W.
Fower Plants, Inc.
Ready Power Co.
Rexelsen—see Electrical Facilities Inc.
heppard Co., R. H.
Fard Leonard Electric Co.
festinghouse Electric International
Co., Cataloged on page 261-264
(World Mining Only)
Yestinghouse Electric Corp.

CHEMICAL CONCENTRATORS

See Concentrating Equipment

CHEMICALS

See Reagents and Chemicals

CHUTES

See Bins, Chutes, and Accessories: Feeders

CLAMPS

See Couplings, hose; Rope, Wire

CLARIFIERS

See Filters, Concentrate; Thickeners and Tanks

CLASSIFIERS

See also Cyclones

AIR Bradley Pulveriser Co.
Combustion Engineering — Super-heater, Inc., Raymond Pulver-Combustion Engineering — Super-heater, Inc., Raymond Pulver-izer Div.

Hardinge Co., Inc., Cataloged on page 97, 162

Kennedy-Van Saun Mfg. & Eng. Corp., Cataloged on page 261

Reliance-Gayeo-eee Universal Road Machinery Co.

Sturtevant Mill Co., Cataloged on page WM 81 (World Mining Only)

page WM 81 (World M Only) Sutton, Steele & Steele, Inc. Universal Road Machinery Co

HYDRAULIC

Delater Concentrator Co., Concenco—Delater Concentrator Co.,
The
Davis Co., Nelson L.
Desister Concentrator Co., The, Cataloged on page 281, 282, 283
Delater Machine Co., Cataloged on page 7
Derry Ce., The, Cataloged on page 1
Eagle Iron Works Eagle Iron Works
Equipment Engineers Inc.
Gibson, W. W.
Graver Tank & Mfg. Co., Inc.
Hardinge Co., Inc., Cataloged on
page 97, 103
Heyl & Patterson, Inc.
Kennedy-Van Saun Mfg. & Eng.
Corp., Cataloged on page 291
Pacific Coast Engineering Co.
Rogers Iron Works Co.
Smith Engineering Works
Wilmot Engineering Co.

MECHANICAL

Akins—see Colorado Iron Works Co.

Bird—see Bird Machine Co.

Bird Machine Co.

Bird Machine Co.

Bird Machine Co.

Bird Machine Co.

Bodinson Mfg. Co.

Colorado Iron Works Co.

Benver Equipment Co., Cataloged

on page 7

Hirseh Bros. Machinery Co.

Kennedy-Van Saun Mfg. & Eng.

Cerp., Cataloged on page 201

Kenyon Machinery Co.

Link-Belt Co., Cataloged on page

WM 78, 77 (World Mining

Only)

Lippmann Engineering Works

Magnetic Engineering & Mfg. Co.

Mine & Smelter Supply Co., The

Marcey Mill Div., Cataloged on

page 184, 184

Morse Bros. Machinery Co.

Neal Machinery Co., H. T.

Sonthwestern Engineering Co.,

Cataloged on page 287 MECHANICAL

Straub Mfg. Co., Inc. Trueline ass Morse Bros. Machin-Trueline—see Morse Bros. Macnin-ery Co. Union Iron Works Wemco—8-H—see Western Machin Western Machinery Co., Cataloged on page Inside Back Cover

CLEANERS

See Filters; Scrubbers

CLOTH

See Filter Media; Screens, Griszlies and Accessories, Ventila-tion Equipment

CLOTHING

See Safety Equipment

COLLECTORS

See Dust Collection Equipment; Reagents and Chemicals

COLUMNS

See Arms and Posts

COMMUNICATIONS

BELL AND BUZZER SYSTEMS Adaptabel—see Edwards Co., Inc. Adaptahorn—see Edwards Co., In Connecticut Telephone & Electr Connecticut Tessphone
Corp.
Edwards Co., Ine.
General Equipment & Mfg. Co.
Graybar Electric Co., Inc.
Lunger—see Edwards Co., Inc.
Patrick & Wilkins Co.
United States Instrument Corp.

MINE TELEPHONES MINE TELEPHONES

Connecticut Telephone & Electric
Corp.
Farmers Eng. & Mfg. Co.
Graybar Electric Co., Inc.
Graybar Electric Co., Inc.
Kellogg Switchboard & Supply Co.
Lowell Insulated Wire Division
Mine & Smelter Supply Co., The,
Catalaged on page 254, 255

Simplex Wire & Cable Co., Cataloged on page 18, 19

United States Instrument Corp.

RADIO SYSTEMS Connecticut Telephone & Electric Connecticut Telephone & Electric Corp.
El-Tronics, Ine.
Flaher Research Laboratory, Ine.
Flaher Research Laboratory, Ine.
Floetway—see Connecticut Telephone & Electric Corp.
General Equipment & Mfg. Co.
Graybar Electric Co., Ine.
International General Electric Co.
Mine Bafety Appliances Co., Cataloged on page 35
Westinghouse Electric International
Co., Cataloged on page 261-264
(World Mining Only)

COMPRESSORS & ACCESSORIES

PORTABLE Acme Machinery Co. American Brake Shoe Co. American Brake Shoe Shoe Co. Cantrell—see Imperial Cantrell Mfg.

Co.
Chicago Pneumatic Tool Co.
Copee Facific, Ltd., Cataloged en
page 53
Curtis Manufacturing Co.
Davey Compressor Co.
Gardner-Denver Co., Cataloged en

Gardner-Denver Co., Cataloged en page 16
Holman Broa., Ltd.
Holman Brothers (Canada) Limited Hyman-Michaels Co. Imperial Cantrell Mfg. Co. Imperial Cantrell Mfg. Co. Imperial Rand Co., Cataloged en page 258, 251, Jaeger Machine Co., The Jey Manufacturing Co., Cataloged on page 235-246
Kenyon Machinery Co.
Le Roi Co., Cataloged on page 248, 249

Le Rei Co., Laterage 249
Sawyer Bailey Corp.
Schramm Inc.
Unitair—see Joy Manufacturing Co.
Worthington Corp.

STATIONARY

Acme Machinery Co.
Allis-Chalmers Mfg. Co., Gen.
Mach. Div., Cataloged on page
9, 289, 286
American Brake Shoe Co.
Amaco—see American Brake Shoe
Co.
Cantrell—see Imperial Cantrell Mfg.
Chicago Pacumatic Tool Co.
Cooper-Beasemer Corp., The
Copeo Pacific, Ltd., Cataloged on
page 38
Curtis Manufacturing Co.
DeLaval Steam Turbine Co.
Fuller Co.
Gardner-Denver Co., Cataloged on
page 16
Holman Bros., Ltd.
Holman Bros., Ltd.
Holman Bros., Ltd.
Holman Bros., Ltd.
Holman Bros., Co.
Ingersol-Rand Co., Cataloged en
page 250, 251
Jaeger Machine Co., Cataloged
on page 252-246
Kenyon Machinery Co., Cataloged
Norwalk Co., Inc.
Sawyer-Balley Corp.

Co. Sawyer-Bailey Corp. Schramm Inc. Westinghouse Air Brake Co. Worthington Corp.

CONCENTRATING EQUIPMENT

See also Classifiers; Flotation Machines, Magnetic Equipment HEAVY MEDIA SEPARATION

HEAVY MEDIA SEPARATION
Akins—see Colorado Iron Works Co.
Colorado Iron Works Co.
Davis Co., Nelson L.
Dings Magnetic Esparator Co., Cataloged on page 27
Hardinge Co., Inc., Cataloged on page 97, 103
Jeffrey Manufacturing Co., The,
Cataloged on page 252
Kennedy-Van Esan Mfg. & Eng.
Corp., Cataloged on page 201
Link-Belt—see Link-Belt Co.
Link-Belt Co., Cataloged on page WM 78, 77 (World Mining Only)

Link-Belt—see Link-Bett Co.
Link-Belt Ca., Cataloged on page
WM 76, 77 (World Mining
Only)
Magnetic Engineering & Mfg. Co.
Memco—see Magnetic Engineering
& Mfg. Co.
Mine & Smelter Supply Co., The
Marcy Mill Div., Cataloged on
page 284, 285.
Singlicity Engineering Co.
Stearns Magnetic, Inc., Cataloged
on page 299
Tennant Sons & Co., Co. of N. Y.
Wessee Mobils-Mill—see Western
Machinery Co.
Western Machinery Co., Cataloged
on page Inside Back Cover

Bendelari, F. N.
Bodinson Mfg. Co.
Coeur d'Alene Hardware & Foundry
Co. Co.
Davis Foundry & Machine Works
Denver Equipment Co., Cataloged
on page 7
Dorr Co., The, Cataloged on page
12

12
Dorrco---see Borr Co., The
James Equipment, Inc.
Jeffrey Manufacturing Co., The,
Cataloged on page 252
"Jimmy"--see James Equipment,

Jeffrey Manufacturing Co., The,
Cataloged on page 252
"Jimmy"—see James Equipment,
Inc.
Landis Steel Co.
Link-Belt—see Link-Belt Co.
Link-Belt Co., Cataloged on page
WM 76, 77 (World Mining
Only)
McLanahan & Stone Corp.
Mine & Smelter Supply Co., The,
Cataloged on page 284, 285
Miners Foundry & Mfg. Co.
Neal Machinery Co., H. T.
Stephen Corp., The, Cataloged on
page 205
Yuba Manufacturing Co., Cataloged
on page 75
Denver Equipment Co., Cataloged
on page 7
Georgia Iron Works Co.
Humphreys—see Humphreys Investment
Co., The,
Cataloged on page 17

ASINING WORID

Jeffrey Manufacturing Co., The, Cataloged on page 252

TABLES
-see Dagley Manufactur-

ing Co.
Concenco—see Deixter Concentrator
Co., The
Dagley Manufacturing Co.
Deixter Concentrator Co., The,
Cataloged on page 281, 282,

283
Deister Machine Co.
Denver Equipment Co., Cataloged Denver Equipment Co., Cataloged on page 7 Denver Fire Clay Co., The, Cata-loged on page 286 Engineers Syndicate, Ltd., Cata-loged on page 76 Gibson, W. W. Gibson,

Gibson, W. W.

James Equipment, Inc.

Mine & Smetter Supply Co., The,
Cataloged on page 284, 285

Minerais et Metaux, Cataloged on
page WM 24 (World Mining
Only)

Neal Machinery Co., H. T.

Stephen Corp., The, Cataloged on
page 265

State Met Corp. Inc.

Stephen Corp., The, Cataloged on page 205
Straub Mfg. Co., Inc.
Wiffley—see Mine & Smelter Supply
Co., The
Yuba Manufacturing Co., Cataloged on page 79

CONCRETING EQUIPMENT, UNDERGROUND

See also Grouting Equipment Chain Belt Co.
Pressed & Welded Product Co.
Pump Crete—see Chain Belt Co.

CONDITIONERS

See Agitators and Conditioners;

CONDUIT

See Cable and Conduit

CONSTRUCTION, MINE PLANT

See Plant Design and Construction

CONTROL EQUIPMENT

See Testing and Control Equipment

CONVERTERS

See Electrical Equipment; Pyrometallurgical Equipment, Transmissions

CONVEYOR EQUIPMENT

See also Scales

BELTS

American Brake Shoe Co. American Rubber Mfg. Co. Amsco-see American Brake Shoe

Barber-Greene Co., Cataloged on page 76 Bear—see American Rubber Mfg. Co.

Co.

Co.

Bodinson Mfg. Co.

Cambridge Wire Cloth Co.

Carlyle Rubber Co., Inc.

Continental Gin Co.

Conveyor Co., The

Crackerjack—see American Rubber

Mfg. Co.

Dick Co., Inc., & J.

Gates Rubber Co., Cataloged on page

Geodall Rubber Co.

29
Goodall Rubber Co., Cataloged en
page 216, 217
Goodrich Co., B. F.
Goodyear Tire & Rubber Co.
Great Seal—see New York Belting
& Packing Co.

Gruendler Crusher & Pulverizer Co.
Hamilton Rubber Mfg. Corp.
Hewitt-Robins Inc.
Holmes & Bros., Inc., Robert
Indestructible—see New York Belting & Packing Co.
Lowa Manufacturing Co., Cataloged
on page 197
Irwin Foundry & Mine Car Co.
Jeffrey Manufacturing Co., The,
Cataloged on page 252
Joy Manufacturing Co., Cataloged
on page 225-240
Kennedy-Van Saun Mfg. & Eng.,
Corp., Cataloged on page 2301
Lamins Steel Co.
Lee Rubber & Tire Corp., Republic
Rubber Div., Cataloged on page
218

118
Link-Belt—see Link-Belt Co.
Link-Belt Co., Cataloged on page
WM 76, 77 (World Mining
Only)

WM 76, 77 (World Mining Only)
Long Co., The Magnetic Engineering & Mfg. Co. Marco-ace Marsh Engineering Co., E. F.
Mine & Smelter Supply Co., The Marcy Mill Div., Cataloged on page 284, 285
New York Belting & Packing Co. Philadelphia Belting Co. Pioneer Rubber Mills Porter Co., H. K., Quaker Rubber Co., H. K., Record Maker-ace Lee Rubber & Tire Corp., Republic Rubber Div.
Raybestos-Manbattan, Inc.

Tire Corp., Republic Rubber Div.
Raybeatos-Manhattan, Inc.
Resistorip—ace New York Belting & Packing Co.
Smith Fower Transmission Co., The Smith Fower Transmission Co., The Strout, Waldron & Co., Inc.
Stephens-Adamson Mgs. Co., Cataloged on page 292
Super Excelo—see Lee Rubber & Tire Corp., Republic Rubber Div Thermoid Co., Cataloged on page 24
Ton-Tex Corp.
Trowbridge—ace Magnetic Engineering & Mfg. Co.
Universal Dredge Mfg. Co., Cataloged on page 48
Web Belting & Supply Co.
Webb Corp., The
Western Foundry Co.
Yuba Manufacturing Co., Cataloged on page 79
Yosemite—ace American Rubber
Mfg. Co.

mite see Mfg. Co.

BUCKETS

American Brake Shoe Co.
American Brake Shoe Co., American
Manganese Steel Div.
Amsco—see American Brake Shoe
Co.
Barber-Greene Co., Cataloged on

Barber-Greene Co., Cataloged on page 76
Bodinson Mfg. Co.
Chain Belt Co.
Christian Engineers, J. D.
Columbia Steel Casting Co., Inc.
Coutmental Gin Co., Industrial Div.
Gregg Co., Ltel., The, Cataloged on page WM 20, 31 (World Mining Only)
Gruendler Crusher & Pulverizer Co.
Hapman Conveyors, Inc.
Helmick Foundry-Machine Co.
Hewitt-Robins, Inc.
Holmes & Bros., Inc., Robert
Iowa Manufacturing Co., Cataloged
On page 197

Iowa Manufacturing Co., Cataloged on page 197
Jeffrey Manufacturing Co., The, Cataloged on page 252
Kennedy-Van Saun Mfg. & Eng. Corp., Cataloged on page 261
Kochring Co., Johnson Co., C. S., a subsid.
Landis Steel Co.
Link-Belt Co., Cataloged on page WM 76, 77 (World Mining Only)
Lipumann Engineering Works

Only)
Lipmann Engineering Works
Magnetic Engineering & Mfg. Co.
Manganese Steel Forge Co.
Marco-see Marsh Engineering Co.,
E. F.
Marsh Engineering Co., E. F.

Mine & Smelter Supply Co., The Marcy Mill Div., Cataloged en page 284, 285 v. Cataloged policy with the control of the control of the cataloged on page 262 co., Cataloged on page 262 raylor-Wharton Iron & Steel Co. Trowbridge—ace Magnetic Engineering & Mfg. Co., Cataloged on page 46 universal Dredge Mfg. Co., Cataloged on page 66 universal Engineering Corp. Watt Car & Wheel Co., The Webb Belting & Supply Co. Webb Corp., The Western Foundry Co. Yuba Manufacturing Co., Cataloged on page 79

American Car & Foundry Co.
Barber-Greene Co., Cataloged an
Podinson Mfg. Co.
Bonded see

Bonded—see Bonded Scale and Machine Co. Christian Engineers. J. D. Bonded Scale and Machine Co. Continental Gin Co. Continental Gin Co. Conveyor Co., The Diamond Iron Works Co. Dick Co., Inc., R. & J. Dodge Manufacturing Corp. Gates Rubber Co., Cataloged on page 19.

Dodge Manufacturing Corp.
Gates Rubber Co., Cataloged on page

30.
Gruendler Crusher & Pulverizer Co.
Hewitt-Robins. Inc.
Hirsch Bros. Machinery Co.
Hirsch Bros. Machinery Co.
Hirsch Bros. Machinery Co.
Holly Pneumatic Systems. Inc.
Holly Pneumatic Systems. Inc.
Holly Pneumatic Systems.
Inc.
Holmes & Bros., Inc.
Robert
Iowa Manufacturing Co., Cataloged
on page 197
Irwin Foundry & Mine Car Co.
Jeffrey Manufacturing Co., The,
Cataloged on page 252
Jones Foundry & Machine Co.,
Joy Manufacturing Co., Cataloged
on page 225-240
Kennedy-Van Baun Mfg. & Eng.
Corp., Cataloged on page 261
Link-Belt—see Link-Belt Co.
Link-Belt Co., Cataloged on page 261
Link-Belt Co., Cataloged on page 261
Link-Belt Co., Cataloged on page 262
Link-Belt Co., Cataloged on page 263
Marco—ace Marsh Engineering Co.,
E. F.
Marsh Engineering Co., E. F.
Mine & Smelter Supply Co., The
Marcy Mill Div., Cataloged on
page 264, 285
Northern Conveyor Co.
Palmer-Hee Co.
Rogers Iron Works Co.
Smith Power Transmission Co., The
Strout, Waldron & Co., Inc.
Stephens-Adamson Mfg. Co., Cataloged on page 262
Taylor-Wharton Iron & Steel Co.
Telluride Iron Works Co.
Culiversal Engineering Corp.
Webb Belting & Supply Co.
Webb Corp., The
Wedg-Grip—ace Christian Engineers, J. D.
Western Foundry Co., Cataloged
on page 79

DUERS

American Brake Shoe Co.

IDLERS

American Brake Shoe Co. Amsco-see American Brake Shoe American Brake Shoe Co.
Amaco-see American Brake Shoe
Co.
Co.
Barber-Greene Co., Cataloged on
page 76
Bodinson Mfg. Co.
Bonded—see Bonded Scale and
Machine Co.
Ronded Scale and Machine Co.
Chain Belt Co.
Chain Belt Co.
Chain Belt Co.
Christian—see Christian Engineers,
J. D.
Continental Gin Co., Industrial Div.
Conveyor Co., The
Diamond Iron Works Co.
Dick Co., Inc., R. & J.
Gates Rubber Co., Cataloged on
Fape 20

Conveyors and Elevators

Gruendler Crusher & Pulverizer Co. Hewitt-Robins, Inc., Robins Conveyors Div. Hirsch Bros. Machinery Co. Holmes & Bros. Inc., Robert Iowa Manufacturing Co., Cataloged on page 197
Irwin Foundry & Mine Car Co. Jeffrey Manufacturing Co., The, Cataloged on page 252
Joy Manufacturing Co., Cataloged on page 225-240
Lamson Corp.
Link-Belt—see Link-Belt Co.

on page 225-240
Lamson Corp.
Link-Belt—see Link-Belt Co.
Link-Belt—see Link-Belt Co.
Link-Belt Co., Cataloged on page
WM 76, 77 (World Mining
Only)
Lippmann Engineering Works
Marco—see Marsh Engineering Co.,
E. F.
Mine & Smelter Supply Co., The
Marcy Mill Div., Cataloged en
page 284, 285
Northern Conveyor Co.
Palmer-Bee Co.
Petilbone Mulliken Corp.
Pioneer Engineering Works, Inc.,
Cataloged on page 260
Rex—see Chain Belt Co.
Round & Son, Inc., David
Smith Power Transmission Co.,
The Control of th

The Stephens-Adamson Mfg. Co., Cataloged on page 202
Taylor-Wharton Iron & Steel Co.
Universal Dredge Mfg. Co., Cataloged on page 66
Iniversal Engineering Corp.
Webb Belting & Supply Co.
Webb Corp., The
Webster Mfg., Inc.
Western Foundry Co., Cataloged on page 78

PILLOW BLOCKS AND HANGERS American Brake Shoe Co. Amsco-see American Brake Sho

American Brake Shoe Co.
Amsco-see American Brake Shoe
Co.
Boston Gear Works
Chain Belt Co.
Boston Gear Works
Chain Belt Co.
Christian Engineers,
J. D.
Christian Engineers, J. D.
Continental Gin Co., Industrial Div.
Conveyor Co.
The
Dick Co., Inc., R. & J.
Dodge Manufacturing Corp.
Gruendler Orusher & Pulverizer Co.
Hewitt-Robins, Inc.
Holmes & Bros., Inc., Robert
Lowa Manufacturing Co., Cataloged
on page 197

Holmes & Bros., Inc., Robert lows Manufacturing Co., Cataloged on page 197
Jeffrey Manufacturing Co., The, Cataloged on page 252
Jones Foundry & Machine Co., W.A. Lamson Corp.
Link-Belt Co., Cataloged on page WM 78, 77 (World Mining Only)
Mine & Smelter Supply Co., The Marcy Mill Div., Cataloged on page 284, 285
Palmer-Bee Co.
Rex—see Chain Belt Co.
Shafer-Concavoex—see Shafer Bearing Div., Chain Belt Co.
Smith Power Transmission Co., The Stephens-Adamson Mfg. Co., Cataloged on page 282
Webb Belting & Supply Co.
Webb Corp., The Western Foundry Co.
Yuba Manufacturing Co., Cataloged on page 79

CONVEYORS AND

ELEVATORS

See also Feeders

BELT

American Brake Shoe Co. American Rubber Mfg. Co. American Brake Shoe

Barber-Greene Co., Cataloged on page 76 Bear-see American Rubber Mfg. Bear see Co. Bodinson Mfg. Co. Bonded—see Bonded Scale and Ma-

Bodmen
Bonded—see Bonded Dunnchine Co.
Bonded Scale and Muchine Co.
Caldwell Co., W.E.
Chain Belt Co.
Christian—see Christian Engineers.

Manufacturer's Complete Names and Addresses are listed in Section II, last pages of this yellow section.

Christian Engineers, J. D.
Connellaville Mfg. & Mine Supply
Co.
Continental Gin Co.
Conveyor Co., The
Crackerjack—see American Rubber Mfg. Co.
Davis Foundry & Machine Works
Diamond Iron Works Co.
Foster Co., L.B.
Gates Rubber Co., Cataloged on
page 26 Foster Co., L.B.
Gates Rubber Co., Cataloged on
page 26
Goodman Manufacturing Co.
Great Seal- see New York Belting
& Packing Co.
Gruendler Grusher & Pulverizer Co.
Hamilton Rubber Mfg. Corp.
Hewitt-Robins, Inc.
Hewitt-Robins, Inc., Robins Conveyors Div.
Hrsch Bros. Machinery Co.
Holmes & Bros., Inc., Robert
Industructible—see New York Belting & Packing Co.
Cataloged on page 252
Jeffrey Manufacturing Co., Cataloged
on page 197
Jeffrey Manufacturing Co., Cataloged
on page 225-246
Kennedy-Van-Saun Mfg. & Eng.
Corp., Cataloged on page 221
Lake Shore Engr. Co.
Lamon Corp.
Landis Steel Co.
Lee Rubber & Tire Corp.—Republic
Rubber Div., Cataloged page
218
Link-Belt—see Link-Belt Co. Link-Belt—see Link-Belt Co. Link-Belt Co., Cataloged on page WM 76, 77 (World Mining Only) Only)

Unity

Only)

Lippmann Engineering Works

Lippmann Engineering & Mfg. Co.

Magnetic Engineering & Mfg. Co.

Marco—see Marsh Engineering Co.,

E. F.

Mine & Smelter Bupply Co., The.

Marcy Mill Div., Cataloged on

Page 284, 285

Miners Foundry Mfg. Co.

New York Belting & Packing Co.

Northers Conveyor Co.

Oliver Corp., The A. B. Farquhar

Div.

New York Bestons
Northern Conveyor Co,
Oliver Corp., The A. B. Farquhar
Div.
Palmer-Bee Co.
Philadelphia Belting Co.
Ploneer Engineering Works, Inc.,
Cataloged on page 200
Pioneer Rubber Mills
Raybestos-Manhattan, Inc.
Reliance—see Universal Road Machinery Co. Floneer Rubber Mills
Raybeatos-Manhattan, Inc.
Reliance—see Universal Road Machinery Co.
Rex—see Chain Belt Co.
Rogers Iron Works Co.
Smith Fower Transmission Co., The
Sprout, Waldron & Co., Inc.
Stephens-Adamson Mig. Co., Cataloged on page 202
Thermold Co., Cataioged on page 24
Throwbridge—see Magnetic Engineering & Mig. Co.
United Iron Works Co.
United Iron Works Co.
Universal Bredge Mig. Co., Cataloged on page 66
Universal Engineering Corp.
Universal Road Machinery Co.
Washington Machinery Co.
Webb Belting & Supply Co.
Webb Corp., The
Webster Mig., The
Yosemite—see American Rubber
Mig. Co.

BUCKET

American Brake Shoe Co.
American Brake Shoe Co., American Brake Shoe Co., American Brake Shoe Div.
Amsco—see American Brake Shoe
Cu.
Barber-Greene Co., Cataloged on Cu.

Cu.

Barber-Greene Co., Cataloged on
page 7d

Bodinson Mfg. Co.

Bonded—see Bonded Scale and Machine Co.

Bonded Scale and Machine Co.

Caldwell Co., W.E.

Chain Belt Co.

Christian—see Christian Engineers
J.D.

Columbia Steel Casting Co., Inc.
Continental Gin Co., Industrial Div.
Conveyor Co., The
Diamond Iron Works Co.

Gregg Co., Ltd., The, Cataloged on
page WM 20, 21 (World Mining
Only)

Gruendler Crusher & Pulveriae Co.

Kapman-Dutton Co., Hapman Conveyors, Inc. Division
Howitt-Robins, Inc.

Hirseh Bros. Machinery Co.

Holmes & Bros., Inc., Robert

Iowa Manufacturing Co., Cataloged on page 197 Jeffrey Manufacturing Co., The, Cataloged on page 252 Kennedy-Van-Saun. Mfg. & Eng. Corp., Cataloged on page 201 Kensington Steel Co. Koehring Co., Johnson Co., C.S. a subaid. subsid.

Lake Shore Engr. Co.

Landia Steel Co.

Link-Belt Co., Cataloged on page
WM 75, 77 (World Mining
Only)

Only)

Only)

Only)

Lippmann Engineering Works
Magnetic Engineering & Mfg. Co.
Marco see Marsh Engineering Co.,

E. F.

Marsh Engineering Co., E. F.

McLanahan & Stone
Northern Conveyor Co.
Palmer-Bre Co.
Ploneer Factor

mer-Bee Co. neer Engineering Works, Inc., Cataloged on page 200 iance—see Universal Road Ma-Cataloged on pag.
Reliance—see Universal Road Machinery Co.
Rex—see Chain Belt Co.
Rogers Iron Works Co.
Smith Engineering Works
Smith Power Transmission Co., The
Sprout, Waldron & Co., Inc.
Stephens-Adamson Mfg. Co., Cataloged on page 292
Sturtevant Mill Co., Cataloged on page WM 81 (World Mining Only)

Startevant Mill Co., Cataloged on page WM 81 (World Mining Only)
Taylor-Wharton Iron & Steel Co. Trowbridge—see Magnetic Engineering & Mfg. Co.
Universal Dredge Mfg. Co., Cataloged on page 66
Universal Engineering Corp.
Universal Road Machinery Co.
Washington Machinery Co.
Webb Belting & Supply Co.
Webb Lorn, The
Webster Mfg., Inc.
Wilmot Engineering Co., Cataloged on page 79

American Brake Shoe Co. American Brake Shoe Co. Amso—see American Brake Shoe Co.
Rodinson Mfg. Co.
Rodinson Mfg. Co.
Christian Engineers, J.D.
Continental Gin Co., Industrial Div.
Conveyor Co., The & Pulverizer Co.
Hevi-Edge—see Christian Engineers, J.D.
Hirsch Bros. Machinery Co.
Holmes & Bros., Inc., Robert
Jeffrey Manufacturing Co.,
Cataloged on page 252
Kennedy-Van-Saun. Mfg. & Eng.
Corp., Cataloged on page 261
Koehring Co., Johnson Co., C.S.
Link-Heit Co., Cataloged on page
WM 76, 77 (World Mining
Only)
Lippmann Engineering Works
Palmer-Ree Co.
Smith Power Transmission Co.,
The
Sprout. Waldron & Co., Inc.

SHAKING OR VIBRATING

SHAKING OR VIBRATING

Ajax Flexible Coupling Co.
Padinson Mfg. Co.
Goodman Manufacturing Co.
Gruendler Crusher & Pulveriser Co.
Holmes & Bros., Inc., Robert
Joy Manufacturing Co., Cataloged
on page 225-240

Kennedy-Van Baun Mfg. & Eng.
Corp., Cataloged on page 201

Link-Beit—see Link-Beit Co.

Link-Beit Co., Cataloged on page
WM 78, 77 (World Mining
Only)

Lippmann Engineering Works

Lippmann Engineering Works Palmer-Bee Co. Smidth & Co., F.L. Smith Power Transmit Smith Power transmission Co., The Stephens-Adamson Mfg. Co., Cata-loged on page 292 Syntron Ce., Cataloged on page 198 Universal Dredge Mfg. Co., Cata-loged on page 68 Webb Corp., The Webb Belting & Supply Co.

COOLERS

Allis-Chalmers Mfg. Co. American Brake Shoe Co. Amsco—see American Brake Shoe Co.

American Brake Shoe
Co.
Bodinson Mfg. Co.
Christian Engineers, J.D.
Hardinge Co., Inc., Cataloged on
page 97, 103
Hold-Filte-see Christian Engineers, J.D.
Jeffrey Manufacturing Co., The,
Cataloged on page 252
Kennedy-Van Saun Mfg. & Eng.
Corp., Cataloged on page 201
Nichols—see Nichols Engineering
& Research Corp.
Nichols Engineering & Research
Corp.

Corp.
Nordberg Manufacturing Co., Cataloged on page 13
Smidth & Co., F.L., Cataloged on page 28B Smidth & Co., F. S., P. S., Page 28B
Stearns Roger Mfg. Co., Cataloged on page 214
Washington Machinery Co.
Webb Corp., The
Windeler Co., Ltd., George

COUNTERS, GEIGER

See Geiger Counters

COUPLERS, CAR

Card Iron Works Co., The C.S., Cataloged on page 246, 247 Cullman Wheel Co. rd Iron Works Co., The C.S., Cataloged on page 246, 247 Ilman Wheel Co. quesne Mine Supply Co. mee Corp., The, Cataloged on page 297-304 terprise Wheel & Car Corp. egg Co., Ltd., The, Cataloged on page WM 26, 21 (World Mining

Gregg Co., Letw., 21 (World Mining Dage WM 26, 21 (World Mining Only)
Hyman-Michaels Co.
Loveloy Flexible Coupling Co.
National Malleable & Steel Castings
Co., Cataloged on page 1
Ohio Brans Co.
Sanford-Day Iron Works Inc.
Willison Automatic—see National
Malleable & Steel Castings Co.

COUPLINGS

See also Transmissions

HOSE HQ5F
American Rubber Mfg. Co.
Sodinson Mfg. Co.
Sodinson Woven Hose & Rubber Co.
Sarlyle Rubber Co., Inc.
Chicago Pneumatic Tool Co.
Copco Pacific, Ltd., Cataloged on
page 53
Eigen Corp. The Chicago Pneumatic Tool Co.
Copce Pacific. Ltd., Cataloged en
page 53

Eimco Corp., The, Cataloged on
page 297-394

Gardner-Denver Co., Cataloged on
page 16

Gates Rubber Co., Cataloged on
page 20

Howitt-Robins, Inc.
Hockensmith Corp., The
Hose Accessories Co.
Ingersoil-Rand Co., Cataloged on
page 26

Knox Mfg. Co.
Mine & Smetter Supply Co., The
Marcy Mill Div., Cataloged on
page 264, 285

New York Belting & Packing Co.
Pioneer Rubber Mills
Snyder & Son, Inc., M.L.
Thor—see Thor Power Tool Co.
Thor Power Tool Co., Cataloged on
nase WM 22 (World Mining
Only)

Trabon Engineering Corp.

nage WM 22 (World Only) Frabon Engineering Corp. Victor Equipment Co.

PIPE Bodinson Mfg. Co.
Clow & Sons, James B.
Copco Pacific, Ltd., Cataloged on page 53
Crane Co.
Eimeo Corp., The, Cataloged on page 297-364
Federal Pipe & Tank Co., Cataloged on page 118
Gardner-Denver Co., Cataloged on

on page 118
Gardner-Denver Co., Cataloged on page 18
Gustin-Bacon Mfg. Co.
Hockensmith Corp., The
Indestructible—see New York Belting & Packing Co.
Johns-Manville
Mine & Smelter Supply Co., The
Marcy Mill Div., Cataloged on
page 284, 285
New York Belting & Packing Co.
Ring Tite—see Johns-Manville

Taylor Forge & Pipe Works Victaulic—see Victaulie Co. of America Victaulic Co. of America

SHAFT & SHAFT FLEXIBLE
Airflex—see Falk Corp., The
Baldwin-Rex—see Chain Belt Co.
Chain Belt Co.
F.A.B. Manufacturing Co.
F.A.B. Manufacturing Co.
Falk Corp., The, Cataloged on page
277-280
Farrel-Bacon—see
ham Co., Inc.
Farrel-Birmingham Co., Inc.
Flex-Ring—see Smith & Serrell,
Inc.

Flex-Ring—see Smith & Serrell.
Inc.
Flexoid—see Smith Power Transmission Co., The
Flexpin—see Smith & Serrell, Inc.
Francke—see Smith & Serrell, Inc.
Link-Beit—see Link-Beit Co.
Link-Beit Co., Cataloged on pure
WM 76, 77 (World Mining
Only)
Smith Power Transmission Co., The

Only)
Smith Power Transmission Co., The Smith & Serrell, Inc.
Steelflex—see Falk Corp., The Thomas Flexible Coupling Co. Twin Disc Clutch Co.

CRANES

See also Excavating Equipment

American Hoist & Derrick Co.
American Steel Dredge Co., Inc.
Baldwin-Lima-Hamilton Corp., Lima
Hamilton Div., Cataloged on
page 10
Bantam-see Schield Bantam Co.
Bay City—see Bay City Shovels,

page 10
Battam—see Schield Bantam Co.
Bat Ofty—see Bay City Shovels,
Inc.
Bay City Shovels, Inc.
Bodinson Mfg. Co.
Bueyrus Erie Co.
Byers Manufacturing Co., The
Clark Equipment Co., Construction
Detroit Floist & Machine Co.
Debbie Foundry & Machine Co.
Dravo Cot Industries, Inc.
Hyster Co.
Industrial Brownholst Corp.
Insley Manufacturing Corp.
Koehring Co.
Krane Kar—see Silent Hoist &
Crane Co.
Lakeside Bridge & Steel Co.
LeTourneau-Westinghouse Co.
Link-Belt Speeder Corp.
Lorain—see Thew Shovel Co.
Lordin-see Thew Shovel Co.
Louden Machinery Co.
Manitowoe—see Manitowoe Engineering Corp.
Manitowoe—see Manitowoe Engineering Corp.
Manitowoe Engineering Corp.
Michigan—see Clark Equipment Co.
Oagood-General
P & H—see Harnischfeger Corp.
Phillipa Mine & Mill Supply Co.
Quick-Way Truck Shovel Co.
Reading—see Reading Crane &
Hoist
Round & Son, David
Round Chain Cos.
Round Woodhouse Chain & Mfg.
Co.
Co.
Ryerson & Son, Inc., Joseph T.
Schield Bantam Co.

Co.
Ryerson & Son, Inc., Joseph T.
Schield Bantam Co.
Silect Holat—see Silent Holst &
Crane Co.
Silent Holat & Crane Co.
Thew Shovel Co.
Tournacranes — see LeTourneauWestinghouse Co.
Washington Iron Works
Wellman Engineering Co.
Whiting Corp.

Wellman Engi

CRUSHERS

See also Laboratory Equipment and Supplies

CONE
Allis-Chalmers Mfg. Co., Gen.
Machy, Div., Cataloged on page
9, 285-298
American Brake Shoe Co.
Amsco—see American Brake Shoe
Co.
Hyman-Michaela Co.
Mine & Smelter Supply Co., The
Marcy Mill Div., Cataloged on
page 284, 285
Neal Machinery Co., H. T.

Nordberg Manufacturing Co., Cata-loged on page 13 Smith Engineering Works Symons—see Nordberg Manufactur-ing Co.

GYRATORY

Allis-Chalmers Mfg. Co., Gen. Mach. Div., Cataloged on page 9, 289-296 American Brake Shoe Co. Amsco—see American Brake Shoe Amacosse American Brake Shoe
Co.
Bradley Pulverizer Co.
Hyman-Michaels Co.
Kennedy-Van Saun Mfg. & Eng.
Corp., Cataloged on Mg.
Lippmann Engineering Works
Mine & Smelter Supply Co., The
Marcy Mill Div., Cataloged on
page 284, 285
Neal Machinery Co., H. T.
Nordberg Manufacturing Co., Cataloged on page 13
Pennsylvania Crusher Co.
Smith Engineering Works
Straub Mfg. Co., Inc.
Sturtevant Mill Co., Cataloged on
page WM 81 (World Mining
Only) see Nordberg Manfacturing Co.
Traylor Engineering & Mfg. Co.,
Cataloged on page 269-276 HAMMER AND IMPACT

Allis-Chalmers Mg. Co., Gen.
Machy. Div., Cataloged on page
9, 289-296
American Brake Shoe Co.
American Pulverizer Company
Amaco—see American Brake Shoe mpany Shoe

American Pulverizer Company
Amsco—see American Brake Shoe
Co.
Combustion Engineering, Inc.
Diamond Iron Works Co.
Gruendler Crusher & Pulverizer Co.
Holmes & Bros., Inc., Robert
Iowa Manufacturing Co., Cataloged
on page 197
Jeffrey Manufacturing Co., Cataloged
on page 252
Kennedy-Van Saun Mfg. & Eng.
Corp., Cataloged on page 201
Lippmann Engineering Works
Mudhog—see Jeffrey Manufacturing
Co., The
Marcy Mill Div., Cataloged on
page 284, 285
Neal Machinery Co., H. T.
Pettibone Mulliken Corp.
Rogers Iron Works Co.
Simplicity Engineering Co.,
Simplicity Engineering Co.,
Sippout, Waldron & Co., Inc.
Stephens-Adamson Mfg. Co., Cataloged on page 202
Universal Engineering Corp.

Allis-Chalmers Mfg. Co., Gen. Mach. Div., Cataloged on page 9, 289-296 Alloy Steel & Metals Co., Cataloged on page 6 American Brake Shoe Co to-see American Brake Shoe -see Bacon-Greene & Milroy Bacon-Greene & Milroy Baldwin-Lima-Hamilton, Cataloged on page 10
Bico, Inc.
Birdsboro Steel Foundry & Machine
Co. -see Denver Fire Clay Co., DEC DFC—see Denver Fire Clay Co.,
The
Denver Equipment Co., Cataloged
on page 7
Denver Fire Clay Co., The, Cataloged
on page 286
Diamond Iron Works Co.
Farrel-Bacon—see Bacon-Greene &
Milroy
Farrel-Bacon—see Farrel-Birmingham Co., Inc.
Gibson, W. W.
Gruendler Crusher & Pulverizer Co.
Hyman-Michaels Co.
Iowa Manufacturing Co., Cataloged
on page 197
Jeffrey Manufacturing Co., The,
Cataloged on page 252
Kennedy-Van Saun Mig. & Eng.
Corp., Cataloged on page 201
Lippmann Engineering Works
Mine & Smelter Supply Co., The
Marcy Mill Div., Cataloged on
page 284, 285
Morse Bros. Machinery Co.
Neal Machinery Co., H. T.
Pacific—see Alloy Steel & Metals
Co.
Pennsylvania Crusher Co., Cata-The ver Equipment Co., Cataloged

Co. Pennsylvania Crusher Co., Cata-loged on page 110 Pettibone Mulliken Corp.

Reliance—see Universal Road Ma-chinery Co. Rogers Iron Works Co. Smith Engineering Works Straub Mfg. Co., Inc. Traylor Engineering & Mfg. Co., Cataloged on page 269-276 Universal Engineering Corp.
Universal Road Machinery Co. Webb Corp., The

ROLL

Allis-Chalmers Mfg. Co., Gon. Mach. Div., Cataloged on page Mach. Div., Cataloged on page 9, 289-296 American Brake Shoe Co. American Car & Foundry Co. Amsco—see American Brake Shoe

Birdsboro Steel Foundry & Machine Co.
Bonded—see Bonded Scale and Machine Co.
Bonded Scale and Machine Co.

Bonded Scale and Machine Co.
Combustion Engineering — Superheater, Inc., Raymond Pulverlear Div.
Denver Equipment Co., Cataloged
on page 7
Denver Frire Clay Co., The, Cataloged on page 286
Diamond Iron Works Co.
Exolon—see Exolon Co., The
Exolon—see Exolon Co., The
Gatke Corp., The
Gatke Corp., The
Guide Corp.
Gruendler Crusher & Pulverizer Co.
Gundlach Machine Co., T. J.
Heyl & Fatterson, Inc.
Hewitt-Robins Inc., Robins Conveyors Div.

veyors Div. Iowa Manufacturing Co., Cataloged on page 197
rey Manufacturing Co., The, Jeffrey Manufacturing Co., Ang. Cataloged on page 252
Kennedy-Van Saun Mfg. & Eng. Corp., Cataloged on page 201
Kenyon Machinery Co.
Link-Belt—see Link-Belt Co.
Link-Belt Co., Cataloged on page WM 76, 77 (World Mining Cont.)

Only)
Lippmann Engineering Works
Stone Corp.

Lippmann Engineering Works
McLanahan & Stone Corp.
Mine & Smelter Supply Co., The,
Marcy Mill Div., Cataloged on
page 284, 285
Neal Machinery Co., H. T.
Pennsylvania Crusher Co., Cataloged on page 110
Pettibone Mulliken Corp.
Rogers Iron Works Co.
Smith Engineering Works
Stephens-Adamson Mfg. Co., Cataloged on page 202
Sturtevant Mill Co., Cataloged on
page WM 81 (World Mining
Only)

page WM 51 (World Mining Only)
Taylor Engineering & Mfg. Co.,
Cataloged on page 269-276
United Iron Works Co.
Universal Engineering Corp.
Webb Corp., The
Webster Mfg., Inc.

CRUSHER PARTS

OTHER THAN PRIMARY CRUSHER MANUFACTURERS ABOVE

JAW AND CHEEK PLATES s-Chalmers Mfg. Co., Gen. Mach. Div., Cataloged on page 9, 289-296 Allie

9, 289-296
Alloy Steel & Metals Co., Cataloged
on page 6
American Brake Shoe Co.
American Manganese Steel Div.
Amsco—see American Brake Shoe

Amsco—see American Brake S. Co.
Bico, Inc.
Columbia Steel Casting Co., Inc.
Diamond Iron Works Co.
Electric Steel Foundry Co.
Gatke Corp.

Electric Steel Foundry Co.
Gathe Corp.

Gathe Corp.

Jeffrey Manufacturing Co., Cataloged
on page 197

Jeffrey Manufacturing Co., The,
Cataloged on page 252

Kennedy-Van Saus Mfg. & Eng.
Corp., Cataloged on page 201

Kensington Steel Co.

Manitoba Steel Foundries Ltd.

McLanahan & Stone Corp.

Pacific—see Alloy Steel & Metals
Co.

see Universal Road Ma-Pennsylvania Crusher Co., Cata-American Brake Shoe Co.
y Co.
n Works Co.
Pettibone Mulliken Corp.
American Brake Shoe Co.
American Manganese Steel Div.
Amsco—see American Brake Shoe loged on page 110
Pettibone Mulliken Corp.
Smith Engineering Works
Sturtevant Mill Co., Cataloged on
page WM 81 (World Mining

page WM 51 (World Min Only) Taylor-Wharton Iron & Steel Co. Traylor Engineering & Mrg. Co. United Iron Works Co. Universal Engineering Corp. Webb Corp., The

CYCLONES

Centriclone—see Oliver United Fil-ters Inc.

Dorr Co., The, Cataloged on page 12

Dorrclone—see Dorr Co., The

Equipment Eng., Inc.

Heyl & Patterson, Inc.

Oliver United Filters Inc.

CYLINDERS AND **ACTUATORS**

Dagley Manufacturing Co. Ledeen Mfg. Co., Cataloged on page Oilgear Co., The Westinghouse Air Brake Co.

DIAMOND DRILL EQUIPMENT

See also BITS, and DRILLS, ROCK See also BITS, and DRILLS, ROCK
Boyles Bros. Drilling Co., Cataloged
on page 25
Boyles Bros. Drilling Co., Ltd.,
(Canada) Cataloged on page
WM 18 (World Mining Only)
Joy Manufacturing Co., Cataloged
on page 225-240
Longyear Co., E. J.
Pennsylvanin Drilling Co.
Sprague & Henwood, Inc., Cataloged on page 221-224

DIAMOND DRILLING

See Exploration Services

DIAMOND DRILLS

See Drills, Rock

DIAMONDS, INDUSTRIAL

Diamond Drill Carbon Co., The Havlick Diamond Drilling Co., Inc. Koebel Diamond Tool Co. McClintock Co., R. S. Patrick, Inc., R. S. Smit & Sons, Inc., J. K. Sprague & Henwood, Inc., Cata-loged on page 221-224

DOORS, MINE

American Mine Door Company, Cataloged on page 212 Canton—see American Mine Door Canton—see American Mine Door Company Clarkson Mfg. Co., Cataloged on page 110 Redbird—see Clarkson Mfg. Co. Richards-Wilcox Mfg. Co.

DRAFTING SUPPLIES

Supplies and Drafting Equipment See Engineering

DRAGLINES See Excavators

DREDGES AND DREDGE BUCKETS

CONNECTED BUCKETLINE American Brake Shoe Co.

Manufacturer's Complete Names and Addresses are listed in Section II, last pages of this yellow section.

Co.
Columbia Steel Casting Co., Inc.
Kensington Steel Co.
Neal Machinery Co., H. T.
Taylor-Wharton Iron & Steel Co.
Universal Dredge Mfg. Co., Cataloged an page 66
Washington Iron Works Washington Iron Works Yuba Manufacturing Co., Cataloged on page 79

CUTTERHEAD (Hydraulic) see also Monitors

American Brake Shoe Co. American Brake Shoe Co. American Manganese Stee Amsco—see American Brake Co.
Birdsboro Steel Foundry & Machine

Co.

Eagle Iron Works
Electric Steel Foundry Co.
Georgia Iron Works Co.
Kensington Steel Co.
Morris Machine Works, Cataloged
on page 206, 207
Taylor-Wharton Iron & Steel Co.
Universal Dredge Mfg. Co., Cataloged on page 66

DRAGLINE DREDGE American Brake Shoe Co. Amsco-see American Brake Shoe Amsco—see American Brake Shoe Co.
Bodinson Mfg. Co.
Bodinson Mfg. Co.
Electric Steel Foundry Co.
Kochring Co.
Maddox Foundry & Machine Works
Neal Machinery Co., H. T.
Pacific Coast Engineering Co.
Universal Dredge Mfg. Co., Cataloged on page 66

DRIFTERS

See Drills, Rock

DRILLING CONTRACTORS

See Exploration Services

DRILL SHARPENERS

See Sharpeners

DRILL STEEL

See Steel

DRILLS, ROCK

See also Diamond Drill Equipment

Augus Drill Sandard Sa

252
Joy Manufacturing Co., Cataloged
on page 225-240
Kerfmaster—see Central Mine
Equipment Co.
Lectonia—see Loctonia Tool Co., The

The Lectonin Tool Co., The McCarthy—see Salem Tool Co., The Mobile—see Mobile Drilling, Inc. Mobile Drilling, Inc. Salem Tool Co., The, Cataloged on page 9

Salem Tool Co., The, Cotana,
page 99
Scranton Electric Construction Co.
Thor—see Ther Power Tool Co.,
Thor Power Tool Co., Cataloged on
page WM 22 (World Mining

-Ramet Corp. CHURN DRILLS Acme Fishing Te Bucyrus-Erie Co. Tool Co.

Honsfeld—see Hossfeld Manufacturing Co.
Hossfeld Manufacturing Co.
Longwar Co., E. J.
Loomis Machine Co.
Mills Iron Works, Inc.
Mobile—see Mobile Drilling, Inc.
Mobile—see Mobile Drilling, Inc.
Neal Machinery Co., H. T.
Sanderson Cyclone Drill Co.
Stardrill-Keystone Co.

CRAWLER MOUNTED DRILLS

Bucyrus-Erie Co. Cyclone—sec Sanderson Cyclone Bueyrus-Eric Co.
Cyclone-sec Sanderson Cyclone
Drill Co.
Ingersoll-itand Co., Cataloged on
page 239, 251
Joy Manufacturing Co., Cataloged
on page 225, 246
Keystone Driller Co.
Landis Steel Co.
Le Roi Co., Cataloged on page 248,
248

Loomis Machine Co. Mobile see Mobile Drilling, Inc. Mobile see Mobile Drilling. Mobile Drilling, Inc. Mobile Drilling, Inc. Sanderson Cyclone Drill Co. Schramm Inc. Stardrill-Keystone Co.

DIAMOND DRILLS

DIAMOND DRILLS

Acker Drill Company, Inc., Cataloged on page 72

American Diamond Drill Co.
Boyles Bros. Drilling Co., Cataloged on page 28

Boyles Bros. Drilling Co., Ltd.
(Canada) Cataloged on page WM 18 (World Mining Only)
Champion Diamond Co.
Chicago Pneumatic Tool Co.
Diamond Drill & Carbon Co., The Diamond Drill & Carbon Co., The Diamond Drill & Carbon Co., Cataloged on page 19

General Electric Co., Carboloy Dept.
Ingersol-Rand Co., Cataloged on page 250, 251

Joy Manufacturing Co., Cataloged on page 225-240

Koebel Diamond Tool Co.
Longyear Co., E. J.
McClintock Co., R. S.
Mobile—see Mobile Drilling, Inc.
Mott Core Drilling Co.
Neal Machinery Co., H. T.
Penndrill—see Pennsylvania Drilling Co.
Pennsylvania Drilling Co.
Sprague & Henwood, Inc., Cataloged

ing Co.
Pennsylvania Drilling Co.
Sprague & Henwood, Inc., Cataloged
on page 221-224
United Iron Works Co.
Wheel Trueing Tool Co., Cataloged
on page 22524-226A

GASOLINE DRILLS AND

Barco Manufacturing Co.
Chicago Pneumatic Tool Co.
Hoasfeld Manufacturing Co.
Joy Manufacturing Co. Cataloged
on page 225-240
Syntron Co., Cataloged on page 198
Warsop Power Tools, Inc.

JET PIERCING DRILLS Mobile—see Mobile Drilling, Inc. Mobile Drilling, Inc. Union Carbon & Carbide Cor Linde Air Products Co., Divisi

JUMBO AND BOOM ASSEMBLIES Chicago Pneumatic Tool Co. Gardner-Denver Co., Cataloged on

Gardner-Denver Co., Cataloged on page 18 Hydro Drill Jib—see Jey Manufac-turing Co. Ingersoil-Rand Co., Cataloged on page 259, 251 Joy Manufacturing Co., Cataloged on page 225-24 Le Rei Co., Cataloged on page 248, 213 249

249
Rogers Iron Works Co.
Thor—see Thor Power Tool Co.
Thor Power Tool Co., Cataloged on
page WM 22 (World Mining
Only)
Winter Weiss Co., The

PERCUSSION DRILLS

Atlas—see Copes Pacific Chicago Pneumatic Tool Co. Copes Pacific, Ltd., Cataloged on page 53 Gordney, Dec. page 53
Gardner-Denver Co., Cataloged on
page 16
Cataloged on Gardner-Denver Co.,
page 16
Ingersoll-Rand Co., Cataloged on
page 259, 251
Joy Manufacturing Co., Cataloged
on page 225-240
Le Roi Co., Cataloged on page 248,
248, Neal Machinery Co., H. T.

Sanderson Cyclone Thor-see Thor Power Tool Co.
Thor Power Tool Co., Cataloged on
page WM 22 (World Mining

STRUCTUS

Chicago Pneumatic Tool Co. Copeo Pacific, Ltd., Cataloged on page 53 Copco Pacific, Ltd., Cataloged on page 53
Gardner-Denver Co., Cataloged on page 16
Ingersoil-Rand Co., Cataloged on page 250, 251
Joy Manufacturing Co., Cataloged on page 225-240
Le Roi Co., Cataloged on page 248, 348 Le Roi Co., Communication of the Co., Co. H. T.
Neal Machinery Co., H. T.
Thor-see Thor Power Tool Co.,
Thor Power Tool Co., Cataloged on page WM 22 (World Mining

Stopers Chicago Pneumatic Tool Co. Copco Pacific, Ltd., Cataloged on page 53 Gardner-Denver Co., Cataloged on Gardner-Denver Co., Cataloged on page 16 Ingersoil-Rand Co., Cataloged on page 259, 251 Joy Manufacturing Co., Cataloged on page 225-240 Le Roi Co., Cataloged on page 248, 249 Le Roi Co., Canada 249
Neal Machinery Co., H. T.
Thor—see Thor Power Tool Co.
Thor Power Tool Co., Cataloged on page WM 22 (World Mining

Wagon Drills Wagon Drills
Chicago Pneumatic Tool Co,
Hossfeld Manufacturing Co.
Ingersoil-Rand Co., Cataloged on
page 259, 251
Jeffrey Manufacturing Co., The,
Cataloged on page 252
Joy Manufacturing Co., Cataloged
on page 225-240

ROTARY DRILLS

Acker Drill Company, Inc., Cata-loged on page 72 Black & Decker Mfg. Co., The Rucyrun-Eric Co. Cardox Corp.
Chicago Pneumatic Tool Co.
Gardner-Denver Co., Cataloged on Gardner-Denver Co., Cataloged on page 18
Ingersoli-Rand Co., Cataloged on page 250, 251
Joy Manufacturing Co., Cataloged on page 225-240
Mobile-see Mobile Drilling, Inc.
Mobile Drilling, Inc.
Mobile Drilling, Inc.
Mobile Drilling, Inc.
Pennarill—see Pennaylvania Drilling Co.
Pentadrill—see Winter Weiss Co.,
The Pennsylva.

Portadrill—see water

The

Stardrill-Keyatone Co.

Thor—see Thor Power Tool Co.

Thor Power Tool Co., Cataloged on

page WM 22 (World Mining page WM 22 (W Only) ascoloy-Ramet Corp. inter Weiss Co., The

SHOT DRILLS

Acker Drill Company, Inc., Cata-loged on page 72 ardox Corp.
ngersoll-Rand Co., Cataloged en
page 259, 251
enndrill-see Pennsylvania Drill-Pennsylvania Drilling Co. Sprague & Henwood, Inc., Cata-loged on page 221-224 Stardrill-Keystone Co.

DRYERS AND KILNS

See also Sintering Machines

See also Sintering Machines
Allia-Chalmers Mfg. Co., Gen.
Mach. Div., Cataloged on page
9, 289-296
American Locomotive Co.
Bethlehem Foundry & Machine Co.
Bethlehem Steel Co.
Centrifugal & Mechanical Industries, inc.
Christian Engineers, J. D.
Colorado Iron Works Co.
Combustion Engineering — Superheater, Inc., Raymond Pulveriser Div.
Denver Equipment Co., Cataloged on page 27-304
Ellectric Steel Foundry Co.
Ellernan—see Ellernan Co., The

General American Transportation
Corp.
Hardinge Co., Inc., Cataloged on
page 97, 163
Hevi Duty—see Hevi Duty Electric
Corp.

General American Transportation
Data Sturtevant Mill Co., Cataloged on
page WM 81 (World Mining
Only)
Turner and Haws Engineering Co.
Western Precipitation Corp.

Hevi Duty—see Hevi Duty Electric

Hevi Duty Electric Co.

Heyi & Patterson, Inc.

Hold-Fitte—see Christian Engineers.

J. D.

Holmes & Bros., Iac., Robert
Indiana Foundry Co.

Iowa Manufacturing Co., Cataloged
on page 197

Kennedy-Van Saun Mfg. & Eng.

Corp., Cataloged on page 201

Kerrigan Iron Works, Inc.

Lowden—see Colorado Iron Works

Co.

McLanshan & Stone Corr.

Co.
McLanahan & Stone Corp.
Neal Machinery Co., H. T.
Nichols Engineering & I Research

Corp.
Nordberg Manufacturing Co., Cataloged on page 13
Pollock Co., The William B.
Smidth & Co., F. L., Cataloged on page 28B
Southern Engineering Co. page 28B Southern Engineering Co. Stearns Roger Mfg. Co., Cataloged on page 214 on page 214
on page 214
on page 214
control of the control of the

DUMPERS, MINE CAR

Atlas Car & Mfg. Co., The, Cataloged on page 245 Card Iron Works Co., The C. S., Cataloged on page 246, 247 Coeur d'Alene Hardware & Foundry Connellsville Mfg. & Mine Supply

Differential Steel Car Co., Cataloged

Cs.

Differential Steel Car Co., Cataloged on page 51
Gregg Co., Ltd., The, Cataloged on page WM 20, 21 (World Minning Only)
Heyl & Patterson, Inc.
Holmes & Bros., Inc., Robert Koehring Co.
Link-Belt Co., Cataloged on page WM 76, 77 (World Mining Only)
Miners Foundry & Mfg. Co.
Nolan—see Nolan Co., The
Nolan Co., The
Roberts & Schaefer Co.
United Iron Works Co.
United Iron Works Co.
Cataloged on page 265-268
Webb Copp., The
Webster Mfg., Inc.
Wellman Engineering Co.

DUST COLLECTION EQUIPMENT

Aerodyne Atlantic Corp.
Allen-Sherman-Hoff Pump Co., The,
Cataloged on page Inside Front
Cover
American Air Filter Co.
American Blower Corp.
American Wheelabrator & Equip-

American Blower Corp.
American Blower Corp.
American Wheelabrator & Equipment Corp.
Buell Engineering Co., Inc.
Combustion Engineering - Superheater, Inc., Raymond Pulverser Div.
Convair, Inc.
Cottrell—see Research Corp.
Dustube—see American Wheelabra-tor & Equipment Corp.
Exiduat—see Lamson Corp.
Flexaust Co., The
Rolly Theumatic Systems, Inc.
Iowa Manufacturing Co., Cataloged
Kennedr-Van Baum Mfg. & Eng.
Corp., Cataloged on page 201
Kirk & Blum Mfg. Co., The
Lamson Corp.
Markely Dust Control System Inc.
Markely Dust Control System Inc.

Lamson Corp.

Markely Dust Control System, Inc.

Markely Dust Control System, Inc.

Mine Safety Appliances Co., Cataloged on page 95

National Filter Media Corp.

Norble—see Northern Blower Co.,

The The

The
Northern Blower Co., The, Cataloged on page 90
Pangborn Corp.
Plummer Mfg. Co., W. A.
Research Corp.
Sly Mfg. Co., The W. W.

urner and Haws Engineering Co. estern Precipitation Corp. estinghouse Electric Corp.

ELECTRICAL EQUIPMENT

also Magnetic ment; Locomotives; Batteries; Chargers; Welding Equipment, Supplies and Services; Hoisting Equipment; Communications; Winches: Cable and Conduit; Testing and Control Equipment

CABLE AND CONDUIT See Cable and Conduit

INSTRUMENTS See Testing and Control Equipment

LIGHT PLANTS Allia-Chalmers Mg. Co., Buda Co., The—a Div. American Locomotive Co. Atlas—see National Supply Co.. American Locomotive Co.
Atlas—see National Supply Co..
The
Cumsins Engine Co., Inc., Cataloged on page 4, 5
Denver Equipment Co., Cataloged on page 7
General Metals Corp., Enterprise
Div.
General Motors Corp., Detroit
Diesel Engine Division, Cataloged on page 21, 220
Fairbanks, Morne & Co.
General Electric Co.
GM Diesel—see General Maters
Corp., Detroit Diesel Engine
Div.
General Motors Overseas Operations,
Cataloged on page WM 19
Cataloged on page WM 19

Cataloged on page (World Mining Only) Georator Corp. Hallett—see Hallett Manufacturing

Co. Hallett Manufacturing Co. Hillman Co., C. Kirk Homelite—see Homelite Corp. Homelite Corp. Joy-Lite—see Joy Manufacturing

Joy-Lite—see Joy Bon. Cataloged Co.
Joy Manufacturing Co., Cataloged on page 225-240
Kato Engineering Co.
Kohler Co.
Lake Shore Electric Corp.
Lister-Blackstone, Inc.
Lister—see National Supply Co., Chister—see National

Lister—see National Supply Co.,
The
Motor Generator Corp.
National Supply Co., The, Engine

National Supply
Div.
Neal Machinery Co., H. T.
Nordberg Manufacturing Co., Cataloge on page 13
Novo Engine Co.
Onan & Sons, Inc., D. W.
Power Plants, Inc.
Ready Power Co.
Sheppard Co., B. H.
Superior—see National Supply Co.,
The Superior—see National
The
Universal Motor Co.
Westinghouse Electric C
Witte Engine Works,
Supply Div. tric Corp.

MOTORS, GENERATORS, AND CONVERTERS

Allia Co., The Louis Allia-Chalmers Mfg. Co., Gen. Mach. Div., Cataloged on page 9, 289-208 256
American Lecomotive Co.
American Machine & Foundry Co.,
Leland Electric Co., The—a Div.
Clark Electronic Corp.
Columbia—see Columbia Electric
Mfg. Co.
Columbia Electric Mfg. Co.
Connecticut Telephone & Electric Corp. tinental Electric Co., Inc.

Continental Electric Co., Inc.
DeWalt Inc.
DeWalt Inc.
Electric Machinery Mfg. Co.
Electric Products Co., The
Elliott—see Elliott Co.
Elliott Co.
Elliott Co.
General Dynamics Corp., Electro
Dynamic Div.
General Electric Co.
General Metals Corp., Enterprise
Div.

General Motors Overseas Opera-tions, Catalogod on page WM 19 (World Mining Only)

Georator Corp. Great Lakes Electrical Mfg. Co. Hallett—see Hallett Manufacturing

Hallett—see Hallett Manufacturing
Co.
Hallett Manufacturing Co.
Harnischfeger Corp., Cataloged on
page 3
Hertner Electric Co., The
Hillman Co., C. Kirk
Ideal Electric & Mfg. Co.
Imperial Electric Co.,
International General Electric Co.,
Cataloged on Inside Front Cover
(World Mining Only)
Ironton Engine Co., The
Kenyon Machinery Co.
Kurz & Root Co.
Norbrush—see Georator Corp.

Norbrush—see Georator Corp. Le Roi Co., Cataloged on page 248, 245 Leland—see Leland Electric Co.,

Lima—see Lima Electric accounts.

The
Lima Electric Motor Co., The
Linde Air Products Co.
Marathon Electric Mfg. Corp.
Marble Card Electric Corp.
Marble Card Electric Corp.
Marble Clectric Co., The
Miehle Printing Press & Mfg. Co.,
Star-Kimble Motor Div.
Mine & Smelter Supply Co., The
Marcy Mill Div., Cataloged en
page 284, 285
Neal Machinery Co., H.T.
Northwestern Electric Co.
Onan & Sons, Inc., D.W.
R & M—see Robbins & Meyers, Inc.
Reliance—see Reliance Electric &
Engineering Co.
Robbins & Meyers, Inc.
Sterling Electric Motors, Inc.
Tri-Clad—see International General
Electric Co.
Uniclosed—see U.S. Electrical
Motors, Inc. see Lima Electric Motor Co., The Electric Motor Co., The

Electric Co.
Uniclosed—see U.S. Electrical
Motors, Inc.
U.S. Electrical Mofors, Inc.
Wagner—see Wagner Electric Corp.
Wagner Electric Corp.
Webb Corp., The
Westinghouse Electric International Co., Cataloged on page 261224 (World Mining Only)
Westinghouse Electric Corp.)

TRANSFORMERS AND RECTIFIERS Allis-Chalmers Mfg. Co., Gen. Mach. Div., Cataloged on page 5, 289-

296
Clark Electronic Corp.
Clark Electronic Corp.
Electrical Facilities Inc.
Engineers Syndicate, Ltd., Cataloged on page 76
Essex Wire Corp., and Cable Div.
Gardner Electric Manufacturing Co.

Co.
General Electric Co.
Hevi-Duty—see Hevi Duty Electric

Hevi-Duty—see Hevi Duty Electric Co.

Hevi-Duty—see Hevi Duty Electric Co.

International General Electric Co.,
Cataloged on page Inside Front
Cover (World Mining Only)
Kolton Electric Mg. Co.
Kopp—see Electrical Facilities Inc.
Leach Corp., Intel Division
Mine & Smeiter Supply Co., The
Marcy Mill Div., Cataloged on
page 284, 285
Moloney Electric Co.
Neal Machinery Co., H.T.
Pennsylvania Transformer Co.
Syntron Co.
Wagner—see Wagner Electric Corp.
Wagner See Wagner Electric Corp.
Westinghouse Electric International
Co., Cataloged on page 261-264
(World Mining Only)
Westinghouse Electric Corp.
Weston Electric Instrument Corp.

MISCELLANEOUS (CONDENSERS.

MISCELLANEOUS (CONDENSERS, RESISTORS, POTENTIOMETERS, ETC.)

ETC.)

Allen-Bradley Co.
Automatic Switch Co.
Biddle Co., James G.
Biddle Co., James G.
Bussmann Mfg. Co.
Clark Electronic Corp.
Columbia—see Columbia Electric
Mfg. Co.
Columbia Electric Mfg. Co.
EC&M Frequency Relay Control—see Electric Controller & Mfg.
Co., The
EC&M Valimitor—see Electric Controller & Mfg.
Co., The
Electric Controller & Mfg. Co., The
Electric Controller & Mfg. Co., The

Elliott Co., Crocker-Wheeler Div. Flood City—see Flood City Brass & Electric Co. & & Electric Co. G. & W. Electric Specialty Co. General Electric Co. I.T.E. Circuit Breaker Co. Ideal Industries, Inc. International General Electric Co., Cataloged on page Inside Front Cover (World Mining Only) Ironton Engine Co., The Joy Manufacturing Co., Cataloged on page 225-240 Memco Engineering & Mfg. Co., Inc.

Memco Engineering
Inc.
Inc.
Meyera Safety Switch Co., Inc.
Minneapolia-Honeywell Regulator
Co., Micro Switch
Ohio Carbon Co., The
Ohiohm—see Ohio Carbon Co., The
Pacific Electric Mfg. Corp.
Reelite—see Appleton Electric Com-

icelite—see Appleton Electric
Juny
Levere Electric Manufacturing Co.
Lehroeder Brothers
Frico Fuse Mfg. Co.
Juliets—see Appleton Electric Unileta

Unileta—see Appleton Escation Company
Westinghonae Electric International Co., Cataloged on page 261-264 (World Mining Only)
Weston Electrical Instrument Corp.
Wickes Corp., The—United States
Graphite Co., a Div.

ENGINEERING

SERVICES

See Plant Design and Construction: Exploration Services

ENGINEERING

SUPPLIES &

DRAFTING

EQUIPMENT See also Surveying Instruments

See cise Surveying Instrumen
Black Diamond Spad Company
Bruning Co., Inc., Chas.
Dietzgen Co., Eugene
Keuffel & Easer Co.
Lufkin Rule Co.
Paragon-Revolute Corp.
Peane Co., The C.F.
Post Co., Frederick
Rocky Mountain Instrument Co.
Warren-Knight Co.
White Co., David
Zernickow Co., O.

ENGINES

See also Electrical Equipment DIESEL AND SEMI-DIESEL

Allis-Chalmers Mfg. Co., Buda Co., The Locomotive Co. Atlas—see National Supply Co., The Baldwin-Lima-Hamilton Corp. Eddystone Div.
Caterpillar Tractor Co. Chicago Fneumatic Tool Co. Cooper-Bessemer Corp., The Cummins Engine Co., Inc., Cataloged on page 4, 5 Fairbanks, Morse & Co. General Metals Corp., Enterprise Div.

Fairbanks, Morse & Co.
General Metals Corp., Enterprise
Div.
General Metals Corp., Enterprise
Engine & Machinery Co.—a
Subsid.
General Motors Corp., Detroit
Diesel Engine Division, Cataloged on page 21, 226
General Motors Overseas Operations,
Cataloged on page WM 19
(World Mining Only)
Hallett Manufacturing Co.
Harnischfeger Corp., Cataloged on
page 73
Hercules Motors Corp.
Hillman Co., C. Kirk
Hyman-Michaels Co.
Ingersoll-Rand Co., Cataloged on
page 250, 151
International — see International
Harvester Export Co.

Manufacturer's Complete Names and Addresses are listed in Section II, last pages of this yellow section.

Co. Waukesha Motor Co.

International Harvester Co., Cataloged on page 91
International Harvester Export Co., Cataloged on page 92
Keeney Co., Paul E.
Klockner-Humboldt-Deuts Ag
Lake Shore Electric Corp.
Lister—see National Supply Co., The

Keckner-Humboldt-Deutz Ag
Lake Shore Electric Corp.
Lister—see National Supply Co.,
The
Mine & Smelter Supply Co., The
Marcy Mill Div., Cataloged on
page 244, 285
Minneapolia-Moline Co.
National Supply Co., The—Engine
Div.
Neal Machinery Co., The—Engine
Div.
Neal Machinery Co., H. T.
Nordberg Manufacturing Co., Cataloged on page 13
Oliver Corp., The
P & H—see Harnischfeger Corp.
Sheppard Co., R. H.
Superior—see National Supply Co.,
The

The
U. S. Steel Corp., Witte Engine
Works, Oil Well Supply Div.
Waukesha—see Waukesha Motor Co.
Worthington Corp.

GAS

Allis-Chalmers Mfg. Co., Buda Co.,
The—a Div.
Atlas—National Supply Co., The
Chicago Pneumatic Tool Co.
Climax Blue Streak—see Climax
Engine & Pump Mfg. Co.
Climax Engine & Pump Mfg. Co.
Continental Motor Corp.
Cummins Engine Co., Inc., Cataloged on page 4, 5
Fairbanks, Morse & Co.
General Metals Corp. Enterprise
Div.

nera. Div.

Div. Accase Corp. Enterprise
Hercules Motors Corp.
Ingersoll-Rand Co., Cataloged on
page 250, 251
International — see. International
Harvester Export Co.
International Harvester Co., Cataloged on page 21
International Harvester Export Co.,
Cataloged on page 91
Klockner-Humboldt-Deutz Ag
Le Roi Co., Cataloged on page 248,
Minneapolis-Moline Co.

Minneapolis-Moline Co. National Supply Co., The, Engine Div.
Nordberg Manufacturing Co., Cataloged on page 13
Novo Engine Co.
Onan & Sons, Inc., D. W.
Superior—see National Supply Co.,

Onsn — Superior—see National Supply Co.,
The
U. S. Steel Corp., Witte Engine
Works, Oil Well Supply Div.
Waukesha—see Waukesha Motor

Waukesha Motor Co. Wisconsin Motor Corp. Worthington Corp.

GASOLINE

Allis-Chalmers Mfg. Co., Buda Co.,
The—a Div.
Briggs & Stratton Corp.
Climax Blue Streak—see Climax
Engine & Pump Mfg. Co.
Climax Engine & Pump Mfg. Co.
Ford Motor Co.
Hercules Motors Corp.
International — see. International
Harvester Export Co.,
International Harvester Co., Cataloged on page 91
International Harvester Export Co.,
Cataloged on page 92
Le Roi Co., Cataloged on page 248,
219
Mine & Smelter Supply Co., The Mine & Smelter Supply Co., The Marcy Mill Div., Cataloged on page 284, 285
Minneapolls-Moline Co.
National Supply Co., The, Engine Div.
Oliver Corp., The Onan & Sons, Inc., D. W.
U. S. Steel Corp., Witte Engine Works, Oil Well Supply Div.
Universal Motor Co.
Waukesha—see Waukesha Motor Co.

See also Tractors and Attachments; Dredges and Dredge Buckets; Loaders; Monitors;

BACKHOIS See Shovels below CABLEWAYS

Slackline
Neal Machinery Co., H. T.
Sauerman Bros., Inc.
Superior-Lidgerwood-Mundy Corp.

CABLEWAYS Tautline

Sauerman Bros., Inc. Superior-Lidgerwood-Mundy Corp. United States Steel Export Co., Cataloged on page 265-268

DRAGLINES-See Shovels Below LOADING BOOMS-See Shevels Below

PARTS AND ATTACHMENTS
Alloy Steel & Metals Co., Cataloged
on page 6
American Brake Shoe Co., American Manganese Steel Div.
Electric Steel Foundry Co.
Marion Power Shovel Co., Cataloged on page 2
Pacific—see Alloy Steel & Metals
Co.

Co.
Page Engineering Co

Page Engineering Co.

SCRAPERS, SELF-PROPELLED
Allis-Chalmers Manufacturing Co.,
Tractor Division, Cataloged on
page 14, 15
Caterpillar Tractor Co.
Carryall—see LeTourneau-Westinghouse Co.
Crichton Co.,
Crichton Co.,
Crichton Co.,
Crichton Corp., Euclid Division, Cataloged on page 241-244
General Motors Corp., Twin Power
Heil Co., The
Landls Steel Co.
LeTourneau-Westinghouse Co.
International Harvester Co., Cataloged on page 91

SHAFT MUCKERS—see Shaft
Sinking

Sinking SHOVELS, POWER

Diesel

American Hoist & Derrick Co. American Steel Dredge Co., Inc. Baldwin-Lima-Hamilton Corp.,
Lima-Hamilton Div., Cataloged on page 19

Bay City—see Bay City Shovels,

Bay City Shovels, Inc.
Bay City Shovels, Inc.
Bucyrus-Eric Co.
Bucyrus-Eric Eyers Manufacturing

liucyrus-Eric Co.
Byers—see Byers Manufacturing
Co., The
Co., The
Byers Manufacturing Co., The
Caterpillar Tractor Co.
Crichton Co.
Clide Iron Works, Inc.
Elimee Corp., The, Cataloged on
page 297-394
Electric Steel Foundry Co.
Garwood Industries Inc.
Hanson Clutch & Machinery Co.
Harnischfeger Corp., Cataloged on
page 397-394
Hyman-Michaels Co.
Hyster Co.

page 73
hyman-Michaels Co.
Hyster Co.
Hyster Co.
Insley Manufacturing Corp.
Keystone Driller Co.
Koehring Co.
Link-Belt Speeder Corp.
Lorain—see Thew Shovel Co.
Manitowoc—see Manitowoe Engineering Corp.
Mariowoc Engineering Corp.
Marion Fower Shovel Co., Cataloge on page 2
Michigan—see Clark Equipment Co.
Neal Machinery Co., H. T.
Northwest Engineering Co.
Oagood-General
P & H—see Harnischfeger Corp.
Quick-Way Truck Shovel Co.
Schield Bantam—see Schield Eantam Co.
Schield Rantam Co.
Thew Shovel Co.

Electric

Bay City—see Bay City Shovels, Inc.
Bay City Shovels, Inc.
Bucyrus-Eric Co.
Byers—see Byers Manufacturing
Co., The
Byers Manufacturing Co., The

Exploration Equipment

page 297-394
Electric Steel Foundry Co.
Harnischfeger Corp., Cataloged on
page 73 Harnischfeger Corp., Cataloged on page 73
Insley Manufacturing Corp.
Koehring Co.
Link-Belt Speeder Corp.
Marion Fower Shovel Co., Cataloged on page 2
Myers-Whaley Co., Inc.
Northwest Engineering Co.
Osgood-General
P & H—see Harnischfeger Corp.
Quick-Way Truck Shovel Co.
Schield Hantam—see Schield Bantam Co. tam Co. Schield Bantam Co.

EXPLORATION EQUIPMENT

see also Drills, Rock

Geochemical Equipment Mobile Drilling, Inc.

Geophysical Equipment is Instrument Mfg. Co., In avis Instrument letestron Corp. lectronics Products Co. lectronics Syndicate, Ltd., Cata-ngineers Syndicate, Ltd., Cata-na page 76 Electronics Froducts Co.
Engineers Syndicate, L44., Cataloged on page 76
Fisher Research Laboratory, Inc.
Georator Corp.
Goldak Co. E. J.
M-Scope—see Fisher Research Laboratory, Inc.
MacClatchie Mfg. Co.
Mobile Drilling, Inc.
Nuclear Instrument & Chemical
Corp. Corp.
Precision Radiation Instruments Inc.
Radiac Co., Inc., The
Salem Tool Co., The
Westinghouse Electric Corp.

EXPLORATION SERVICES

DRILLING

Churn
Acme Drilling Service
Diamond Drill Contracting Co.
Engineers Syndicate, Ltd.
Hillman Co., C. Kirk
Judd & Son, J. D.
Koebel Diamond Tool Co.
Longyear Co., E. J.
Mobile Drilling, Inc.
Pennsylvania Drilling Co.
Byrague & Henwood, Inc., Cataloged on page 221-224
Yuba Manufacturing Co., Cataloged on page 79 Churn

Diumond

Acme Drilling Service
Boylee Bros. Drilling Co., Cataloged on page 25
Boyles Bros. Drilling Co. Ltd.,
(Canada), Cataloged on page
WM 18 (World Mining Only)
Diamond Drill Contracting Co.,
Cataloged on page 118

(Canada), Cataloged on page
WM 18 (World Mining Only)
Diamond Drill Contracting Co.,
Cataloged on page 119
Engineers Syndicate, Ltd., Cataloged on page 126
Havlick Diamond Drilling Co., Cataloged
on page 225-246
Longwar Co., E. J.
Manu-Mine Research & Development Co.
McClinteck Co., R. S., Cataloged
on page 119
McDonald, T. J.
Minerals Engineering Co.
Mobile Drilling, Inc.
New World Exploration, Res. &
Dev. Corp.
Palmer & Decker
Pennsylvania Drilling Co.
Sprague & Henwood, Inc., Cataloged on page 211-224
Tinney Drilling Co.

Retary

Retary Retury

Cardox Corp.
Engineers Syndicate. Ltd., Cataloged on page 76
Joy Manufacturing Co., Cataloged on page 225-240
Mobile Drilling, Inc.
Pennsylvania Drilling Co.

SURVEYING

Abrama Aerial Survey Corp.

Eimco Corp., The, Cataloged on Aero Service Corp., Cataloged on FEEDERS
page 297-304

FEEDERS

Only
Chapman and Wood
Engineers Syndicate, Ltd., Cataloge on page 76
Fairchid Aerial Surveys Inc.
Laylander, Philip A., Cataloged on page 119
Longyenr Co., E.J.,
New World Exploration, Res. &
Dev. Corp.
Precision Radiation Instruments,
Inc. Inc. Radiac Company, Inc., The Still, Arthur R., Cataloged on page 119

Geachemical Genechemical
Engineers Syndicate, Ltd., Cataloged on page 76
Laylander, Philip A., Cataloged on page 119
Manu-Mine Research & Development Co.
New World Exploration, Res. & Dev. Corp., Radiac Co. Inc., The

Geological Chapman and Wood
Engineers Syndicate, Ltd., Cataloged on page 76
Flaher Rosearch Laboratory, Inc.
Relly, John E., Cataloged on page 119
Laylander, Philip A., Cataloged on page 119
Longyear Co., E.J.
M. Scope—see Fisher Research Laboratory, Inc.
Manu-Mine Research & Development Co.
Murphy, F.M., Cataloged on page 119
Nature 119
N World Exploration, Res. & New World Exploration, Res. & Dev. Corp. Radiac Co Inc., The Stephenson, Robert C. Still, Arthur R., Cataloged on page 119

Goophysical
Aero Service Corp., Cataloged on
page WM 17 (World Mining Aero Service Corp., Catalogee on page WM 17 (World Mining Only)
Engineers Syndicate, Ltd., Cataloged on page 76
Fisher Research Laboratory, Inc. Longyear Co., E. J.
M-Scope—see Fisher Research Laboratory, Inc.
New World Exploration, Res. & Dev. Corp.
Precision Radiation Instruments, Inc. New World Exploration, Res. & Dev. Corp.
Precision Radiation Instruments, Inc.
Radiac Co. Inc., The
Still, Arthur R., Cataloged on page
119
Union Oil Co. of California

EXPLOSIVES

See Blasting Supplies

See Ventilation Equipment and Supplies

FASTENERS, BELT

American Rubber Mfg. Co.
Armstrong-Bray & Co.
Carlyle Rubber Co., Inc.
Clipper—see Clipper Belt Lacer Co.
Clipper Belt Lacer Co.
Continental Gin Co.—Industrial Div.
Crescent—see Crescent Belt Fasten-Continental Gin Co.—Industrial Div. Crescent—see Crescent Belt Fastener Co. Crescent Belt Fastener Co. Detroit Belt Lacer Co. Dick Co. Ine., R. & J. Edwards & Co., H. D. Fenwick Manufacturing Co. Flexible Steel Lacing Co. Goodman Manufacturing Co. Hayden—see National Mine Service Co. see Fenwick Manufactur-Jackson—see Fenwick Manufactur-ing Co.

Joy Manufacturing Co., Cataloged on page 225-240

Keystone Steel & Wire Co.

National Mine Service Co.

Plategrip—see Armstrong-Bray & Joy Co.
Sawyer Belt Hook Co.
Steelgrip—see Armstrong-Bray & Co.
Talcott, Inc., W.O. & M.W.
Webb Corp., The
Webb Belting & Supply Co.

ORE

Apron

Ajax Flexible Coupling Co.

American Brake Shoe Co.

Amsco—see American Brake Shoe American Brake Shoe Co.
American Brake Shoe Co.
American—see American Brake Shoe
Barber-Greene Co., Cataloged on
page 76
Bodinson Mfg. Co.
Christian Engineers, J. D.
Continental Gin Co.—Industrial Div.
Conveyor Co., The
Denver Equipment Co., Cataloged
on page 7
Diamond Iron Works Co.
Electric Steel Foundry Co.
Hardinge Co., Inc., Cataloged on
page 97, 103
Hewitt-Robine, Inc.
Hysi & Patterson, Inc.
Hysi & Patterson, Inc.
Hysi & Patterson, Inc.
Cataloged on page 252
Kennedy-Van Saun Mfg. & Eng.
Corp., Cataloged on page 201
Kensington Steel Co.
Link-Belt—see Link-Belt Co.
Link-Belt—see Link-Belt Co.
Link-Belt—see Link-Belt Co.
Only, 77 (World Mining
Only)
Lippmann Engineering Works
Marco—see Marsh Engineering Co.,
Marco—see Marsh Engineering Co.

Only)
Lippmann Engineering Works
Marco-ace March Engineering Co.,
E. F.
Mine & Smeiter Supply Co.,
Marsh Engineering Co., E. F.
Mine & Smeiter Supply Co.,
The,
Cataloged on page 284, 285
Miners Foundry & Mfg. Co.
Morse Bros. Machinery Co.
Nesi Machinery Co., H. T.
Nordberg Manufacturing Co., Cataloged on page 13
Pettibone Mulliken Corp.
Pioneer Engineering Works, Inc.,
Cataloged on page 206
Reliance—see Universal Road Machinery Co.

Peloner Engineering Works, Inc., Cataloged on page 200
Reliance—see Universal Road Machinery Co.
Rose—see Chain Belt Co.
Rogers Iron Works Co.
Rose—see Ross Screen & Feeder Co., Cataloged on page 190
Smith Engineering Works
Southwestern Eng. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 202
Traylor Engineering & Mfg. Co., Cataloged on page 202
Traylor Engineering & Mfg. Co., Cataloged on page 200
Universal Dredge Mfg. Co., Cataloged on page 200
Universal Dredge Mfg. Co., Cataloged on page 66
Universal Brade Machinery Co.
Washington Machinery Co.
Washington Machinery Co.
Webb Corp. The
Webster Mfg. Inc.
Wilmot Engineering Co.

Balt Barber-Greene Co., Cataloged on page 48 Bodinson Mfg. Co.
Bonded Scale and Machine Co.
Chain Belt Co.
Christian see Christian Engineers,
J. D.
Christian Engineers J. D.

Christian—see Christian Engineers, J. D.
Christian—see Christian Engineers, J. D.
Connellaville Mfg. & Mine Supply Co.
Continental Gin Co., Industrial Div. Conveyor Co., The
Denver Equipment Co., Cataloged
on page 7; 163
Hardinge Co., Inc., Cataloged on
page 97, 163
Hewitt-Robins, Inc., Robert
Indestructible—see New York Belting & Packing Co.
Jeffrey Manufacturing Co., The,
Cataloged on page 252
Joy Manufacturing Co., Cataloged
on page 225-246
Kennedy-Van Saun Mfg. & Eng.
Corp., Cataloged on page 261
Link-Belt—see Link-Belt Co.
Link-Belt Co., Cataloged on page
WM 78, 77 (World Mining)
Only)
Lippmann Engineering Works
Marco—see Marnh Engineering Co.

Only)
Lippmann Engineering Works
Marco-see Marsh Engineering Co.,
E. F.
Marsh Engineering Co., E. F.

Mine & Smelter Supply Co., The Marcy Mill Div., Cataloged on page 284, 285 Miners Foundry & Mfg. Co. Morse Bros. Machinery Co. Neal Machinery Co., H. T. Sorthern, Consessor, Co. Norse Oros. Machinery Co., H. T.
Northern Conveyor Co.
iew York Belting & Packing Co.
Omega Machine Co.
Rex—see Chain Belt Co.
Smith Engineering Works
Southwestern Eng. Co., Cataloged
on page 284
Stephens-Adamson Mfg. Co., Cataloged
on page 287
Straub Mfg. Co., Inc.
Teleuride Iron Works
Oniversal Dredge Mfg. Co., Cataloged on page 68
Wight Co., Inc.
Teleuride Iron Works
Oniversal Dredge Mfg. Co., Cataloged on page 68
Washington Machinery Co.
Webb Corp., The Chain

Chuin

Amsco—see American Brake Shoe
Co.
American Brake Shoe Co.
Sodinson Mfg. Co.
Onded—see Bonded Scale and Machine Co.
Bonded Scale and Machine Co.
Bonded Scale and Machine Co.
Christian Engineers, J. D.
Christian Engineers, J. C.
Chine Edel Foundry Co.
Hapman Conveyors, Inc.
Heyl & Fatterson, Inc.
Heyl & Fatterson, Inc.
Holmes & Bros., Inc., Robert
Jeffrey Manufacturing Co., Cataloged
on page 225-246
Link-Belt Co., Cataloged on page
WM 76, 77 (World Mining
Only)
Lipumann Engineering Works

Link-Heit Co., Cataloged on page WM 76, 77 (World Mining Only)
Lippmann Engineering Works
Northern Conveyor Co.
Ross—see Ross Screen & Feeder Co., Cataloged on page 199
Smith Engineering Works
Stephens-Adamson Mig. Co., Cataloged on page 202
Universal Dredge Mig. Co., Cataloged on page 66
Webb Corp., The

Constant Weight m-Bin—see Pulva Corp.
nver Equipment Co., Cataloged
on page 7 Com-Bin—see Pulva Corp.
Denver Equipment Co., Cataloged
on page 7
Hardinge Co., Inc., Cataloged on
page 97, 103
Jeffrey Manufacturing Co., The,
Cataloged on page 252
Merrick Scale Mfg. Co., Cataloged
on page 213
Poidometer—see Schaffer Poidometer Corp. Poidometer—see Schaffer Poidometer Co.
Pulva Corp.
Schaffer Poidometer Co.
Simplicity Engineering Co.
Sintering Machinery Corp.
Syntron Ca., Cataloged on page 198
Transportofeeder—Sintering Machinery Corp.
Waytrol—see
Jeffrey Manufacturing Co., The
Webb Corp., The

Pen
Bodinson Mfg. Co.
Bonded—see Bonded Scale and Machine Co.
Bonded Scale and Machine Co.
Chain Belt Co.
Christian—see Christian Engineers,
J. D.
Christian Engineers, J. D.
Connellaville Mfg. & Mine Supply onveyor Co., The enver Equipment Co., Cataloged Denver Equipment Co., Cataloged on page 7
Diamond Iron Works Co.
Electric Steel Foundry Co.
Hewitt-Robins, Inc.
Heyl & Patterson, Inc.
Hirsch Bros. Machinery Co.
Holmes & Bros. Inc., Robert
Jeffrey Manufacturing Co., The,
Cataloged on page 252
Joy Manufacturing Co., Cataloged
on page 225-240
Kennedy-Van Laun Mfg. & Eng.
Corp., Cataloged on page 201
Link-Belt Co., Cataloged on page WM 76, 77 (World Mining
Only)

Only)
Lippmann Engineering Works
Marco-see Marsh Engineering Co.,
E. F.
Marsh Engineering Co., E. F.

Cataloged on page 110
Coeur d'Alene Hardware & Foundry
Co.
Denver Equipment Co., Cataloged
on page 7
Guipment Engineers Inc.
Feedorator—see Fischer & Porter
Co.
Fisher & Porter Co.
Galigher Co., The, Cataloged on
page 87
Geary—see Galigher Co., The
Geary Junior—see Galligher Co.,
The
Gibson, W. W.
Jeffrey Manufacturing Co., The,
Cataloged on page 252
Mine & Smelter Supply Co., The
Marcy Mill Div., Cataloged on
page 284, 285
Minerals et Metaux, Cataloged on
page WM 24 (World Mining
Only)
Morse Bros. Machinery Co.
Stearns Roger Mfg. Co., Cataloged
on page 214
Syntron Co., Cataloged on page 198
Ziegler—see Coeur d'Alene
Hardware Foundry Co.

FILTER MEDIA

Celite—see Johns-Manville
Cranite—see Honan-Crane Corp.
Dagley Manufacturing Co.
Eimeo Corp., The, Cataloged on
page 297-394
Feon—see Filteration Engineers, Feon-see Inc.
Filteration Engineers, Inc.
Filteration Engineers, Woolen Fumeali — see Portland Woolen
Mills, Inc.
Houdaille-Hershey Corp., HonanCrane Corp., Subsid.
Johns-Manville
National Filter Media Corp.
Nem—see National Filter Media National Filter Media Corp.
Nem—aee National Filter Media
Corp.
Paleonia—see Honan-Crane Corp.
Pendleton Woolen Mills
Plummer Mfg. Co., W. A.
Portland Woolen Mills, Inc.
Industrial Fabrics Div.
Shriver & Co., Inc., T.
Stanley Co., Inc., William W.
Victor—see Stanley Co., Inc., William W. liam W. Winslow Engineering Co.

FILTERS

AIR American Water Softener Co.
American Wheelabrator & Equipment Corp.
Bemis Bro. Bag Co., Cataloged on page 86
Convair, Inc.
Dustube—see American Wheelabrator. Convair, Inc.

Dustube—see American Wheelabrator & Equipment Corp.

Ingersoll-Rand Co., Cataloged on
page 259, 251

Kennedy-Van Saun Gorp., Cataloged on page 201

Permutit Co.

Plummer Mfg. Co., W. A.

Stanley Co. Inc., William W.

Victor Equipment Co.

Westinghouse Air Brake Co.

Winslow Engineering Co., Cataloged on page 62 CONCENTRATE Americane Oliver United Filters

Bec-Tec-see Galigher Co., The

Miners Foundry & Mfg. Co.
Morse Bros. Machinery Co.
Pioneer Engineering Works, Inc.,
Cataloged on page 280
Rex—see Chain Belt Co.
Simplicity Engineering Works
Southwestern Engineering Works
Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 287
Stephens-Adamson Mfg.

Inc.
Oliver United Filters Inc.
Peterson—see Peterson Filters &
Engineering Co.
Peterson Filters & Engineering Co.
Plummer Mfg. Co., W. A.
Shriver & Co., Inc., T.
Sintering Machinery Corp.
Sweetland—see Oliver United Filters Inc.
U. S. Hoffman Machinery Corp.

OIL

Eimco Corp., The, Cataloged en page 297-304 Ferro Filter—see Frantz Co., Inc., Ferro Filter—see Frantz Co., Inc., S. G.
S. G.
Frantz Co. Inc., S. G.
Hauck Manufacturing Co.
Houdaille-Hershey Corp.
Oliver United Filters Inc.
Plummer Mfg. Co., W. A.
Shriver & Co., Inc., T.
Stanley Co. Inc., William W.
Winslow Engineering Co., Cataloged
on page 62

FIRST AID SUPPLIES

See Safety Equipment

FLOTATION MACHINES

Agitair—see Galigher Co., The Booth—see Booth Engineers Booth Engineers Coeur d'Alene Hardware & Foun-Booth displayed and a control of the ment Co., Cataloged Denver Equipment Co., Cataloged on page 7 Fagergrens & Steffensens—see West-ern Machinery Co. Galigher Co., The, Cataloged on page 87 Gibson, W. W. Jetair—see Morse Bros., Machinery Co.

Co.
Kennedy-Van Saun Mfg. & Eng.
Corp., Cataloged on page 201
Kenyon Machinery Co.
Mine & Smelter Suspiy Co., The
Marcy Mill Div., Cataloged on
page 284, 285
Minemet—see Minerals et Metaux
Minerals et Metaux, Cataloged on
page WM 24 (World Mining
Only)

Minerals et Metaux, Cataloged on page WM 24 (World Mining Only) Morse Bros. Machinery Co., Neal Machinery Co., H. T. Stearns Roger Mfg. Co., Cataloged on page 214 Sutton, Steele & Steele, Inc. Western Machinery Co., Cataloged on page Inside Back Cover

Air Reduction Sales Co.
Bailey Meter Co.
Barber-Colman Co.—Wheelco Instrument Div. B-I-F Industries, Inc.
Bristol Co., The Chatillon & Sons, John Fisher & Porter Co.
Foxboro Co., The
H-B Instrument Co., Inc.
Lunkin Rule Co.
Lunkenheimer Co., The
Merlam Instrument Co., The
Minneapolis-Honeywell Regulator
Co.

Co.
New Jersey Meter Co.
Ratosight—see Fisher & Porter Co.
Westinghouse Air Brake Co.
Weston Electrical Instrument Corp.

GEARS

See also Speed Changers

American Brake Shoe Co. American Brake Shoe

Co.

Co.

Bodinson Mfg. Co.

Bodinson Gear Works
Christian—see Christian Engineers,
J. D.

Christian Engineers, J. D.

Cleveland Worm & Gear Co., The
Columbia Steel Casting Co. Inc.

Cullman Wheel Co.

Dutl-Rated—see Foote Bros. Gear &

Machine Corp.

Falk Corp. The

Farrel—see Farrel Birmingham Co.,
Inc.

Inc.
Farrel-Birmingham Co., Inc.
Flood City—see Flood City Brass

Inc.
Farrel-Birmingham Co., Inc.
Flood City—ace Flood City Brass & Electric Co.
Flood City Brass & Electric Co.
Flood City Brass & Electric Co.
Flood City Brass & Electric Co.
Foote Bros. Gear & Machine Corp.
Gatke Corp.
Hirsch Bros. Machinery Co.,
W. A.
Kennedy-Van Saun Mfg. & Eng.
Corp., Cataloged on page 201
Link-Belt —ee Link-Belt Co.,
Link-Belt —ee Link-Belt Co.
Link-Belt —ee Link-Belt Co.
Perkins Machine Co.
Perkins Machine Co.
Perkins Machine & Gear Co.
Philadelphia Gear Works, Inc.
Tool Steel Gear & Pinion Co., The
Vulcan Iron Works, (Pa.)
Webb Corp., The
Western Gear Works
Western Gear

Plant
Westinghouse Electric International
Co., Cataloged on page 261-264
(World Mining Only) Worthington Corp. Yuba Manufacturing Co., Cataloged on page 79

Manufacturer's Complete Names and Addresses are listed in Section II, last

pages of this yellow section.

GEIGER COUNTERS

See also Exploration Equipment

Colorado Assaying Co., Cataloged on page 119
Detectron Corp.
El-Tronica, Inc. Engineers Syndicate, Ltd., Cataloged on page 76
Goldak Co., The
Nucleonic Company of America
Nuclear Instrument & Chemical Nuclear Instrument & Chemical Corp. Precision Radiation Instruments,

Inc.
Super Sniffer—see Nuclear Instrument and Chemical Corp.
Technical Associates

GENERATORS

See Electrical Equipment

GEOPHYSICAL SURVEYS

See Exploration Services

GIANTS

See Monitors

GRADERS

Allis-Chalmers Manufacturing Co., Tractor Division, Cataloged on page 14, 15 Caterpillar Tractor Co. Pettibone Mucliken Corp.

GRINDERS

See Sharpeners, Bit

GRINDING EQUIPMENT

BALL MILLS

Allis-Chalmers Mfg., Co., Gen.
Mach. Div., Cataloged on page
9, 289-298

American Brake Shoe Co.
Amsco—see American Brake Shoe
Co.
Denver Equipment Co., Cataloged
on page 7

Elmco Corp., The, Cataloged on
page 297-304

Foster Wheeler Corp.
Gibson, W.W.
Hardinge Co., Inc., Cataloged on
page 97, 103

Hirsch Bros. Machinery Co.
Hyman-Michaels Co.
International Combustion, Ltd.,
Cataloged on page WM 23

(World Mining Only)

Kennedy-Van Saun Mfg. & Eng.
Corp., Cataloged on page 201

Kenyon Machinery Co.
Lake Shore Engr.
Marcy—see Mine & Smelter Supply

Kennedy-Van Saun Mfg. & Eng.
Corp., Cataloged on page 291
Kenyon Machinery Co.
Lake Shore Engr.
Marcy—see Mine & Smelter Supply
Co., The
Mine & Smelter Supply Co., The.
Marcy Mill Div., Cataloged on
page 284, 285
Miners Foundry & Mfg. Co.
Morse Bros. Machinery Co.
Neal Machinery Co., H.T.
Nordberg Manufacturing Co., Cataloged on page 134
Pacific Coast Engineering Co.
Smiddt & Co., F.L., Cataloged on
page 28B
Stearns Roger Mfg. Co., Cataloged
on page 214
Straub Mfg. Co., Inc.
Traylor Engineering & Mfg. Co.,
Cataloged on page 289-276
Union Iron Works
Webb Corp., The

BALLS

Allis-Chalmers Mfg. Co., Gen. Mach. Div., Cataloged on page 9, 283-296

American Car & Foundry Co. Bethlehem Steel Co. Bethlehem Steel Co. Eastern Electro-Casting Co. Ltd. C F. & I.-see Colorado Fuel & Iron Corp., The Calumet & Hecla, Inc. Coates Steel Products Co. Coeur d'Alene Hardware & Foundry Co.

Colorado Fuel & Iron Corp., The.

Colorado Fuel & Iron Corp., The, Cataloged on page 28A, 210, 211

Denver Equipment Co., Cataloged on page 7
Eastern Electro-Casting Co. Ltd. Endicott Forging & Mig. Co. Hardinge Co., Inc., Cataloged on page 37, 183
Rennedy-Van Saun Mig. & Eng. Corp., Cataloged on page 210
Marcy—ee Mine & Smelter Supply Co., The Mine & Smelter Supply Co., The, Marcy Mill Div., Cataloged on page 284, 285
National Maileable & Steel Castings Co., Cataloged on page 11
Sheffield Steel Corp.
U.S. Steel Corp.
United States Steel Export Co., Cataloged on page 26, 265-268
Wasatch Ball Foundry, Inc., Cataloged on page 198
Wasatch Ball Foundry, Inc., Cataloged on page 267-288
Wasatch Ball Foundry, Inc., Cataloged on page 198
Washington Iron Works
Western Foundry Co.

PERBLE MILLS Allia-Chalmers Mfg. Co., Gen. Mach, Div., Cataloged on page 9, 289-29 Denver Equipment Co., Cataloged

9, 289-296
Denver Equipment Co., Cataloged
on page 7
Elmeo Corp., The, Cataloged on
page 297-304
Hardinge Co., Inc., Cataloged on
page 97, 162
Kennedy-Van Sann Mfg. & Eng.
Corp., Cataloged on page 261
Marcy—Mine & Smelter Supply Co.,
The

Kennesy-van
Corp., Cataloged on page 291
Marcy—Mine & Smelter Supply Co.,
The
Mine & Smelter Supply Co., The,
Marcy Mill Div., Cataloged on
page 284.285
Morse Bros. Machinery Co., Neal Machinery Co., H.T.
Nordherg Manufacturing Co., Cataloged on page 13
Smidth & Co., F.Lo., Cataloged on
page 28B
Straub Mfg. Co., Inc.
Traylor Engineering & Mfg. Co.,
Cataloged on page 265-276
Webb Corp., The
ROD MILLS

a-Chalmers Mfg. Co., Gen. Mach. Div., Cataloged on page 9, 289-296

American Brake Shoe Co. Amaco see American Brake Shoe

Kenyon Machinery Co.
Marey—Mine & Smelter Supply Co., The,
The,
Mine & Smelter Supply Co., The,
Marey Mill Div., Cataloged on
page 284, 285
Miners Foundry & Mfg. Co.
Morse Bros. Machinery Co.
Neal Machinery Co., H.T.
Nordherg Manufacturing Co., Cataloged on page 12
Pacific Coast Engineering Co.
Stearas Reger Mfg. Co., Cataloged
on page 214
Traylor Engineering & Mfg. Co.,
Cataloged on page 289-276
Washington Iron Works
Webb Corp., The

RODS Allis-Chalmers Mfg. Co., Gen. Machy. Div., Cataloged on page 9, 289-296

B. 289-296
Bethlehem Pacile Coast Steel Corp.
C F & 1—see Colorado Fuel & Iron
Corp., The
Colorado Fuel & Iron Corp., The
Cataloged on page 28A, 210, 211
Denver Equipment Co., Cataloged
on page 7
Harding

Denver Equipment Co., Cataloged on page 7
Hardinge Co., Inc., Cataloged on page 97, 103
Rennedy-Van Bann Mfg. & Eng. Corp., Cataloged on page 361
Marcy—see Mine & Smelter Supply Co., The Marcy Mill Div., Cataloged on page 284, 285
Sheffield Steel Corp., United States Steel Export Co., Cataloged on page 284, 285

Cataloged on page 265-268

TUBE MILLS Allie-Chalmers Mfg. Co., Gen. Mach, Div., Cataloged on page 9, 289-296

American Brake Shoe Co.

Amsco see American Brake Shoe Co. Denver Equipment Co., Cataloged on page 7 on page 7
Eimco Corp., The, Cataloged on page 297-364
Hardings Co., Inc., Cataloged on

page 297-304
Hardinge Co.. Inc., Cataloged on page 97, 103
Rennedy-Van Saum Mfg. & Eng. Corp., Cataloged on page 201
Lake Shore Engr.
Marcy—see Mine & Smelter Supply Co., The Marcy Mill Div., Cataloged on page 284, 285
Mine & Smelter Supply Co., The Marcy Mill Div., Cataloged on page 284, 285
Morse Bros. Machinery Co., Nordberg Manufacturing Co., Cataloged on page 284, 285
Smidth & Co., F.L., Cataloged on page 286
Straub Mfg. Co., Inc.

Smidth & Lee,
page 28B
Straub Mfg. Co., Inc.
Traylor Engineering & Mfg. (
Cataloged on page 269-276
Washington Iron Works
Webb Corp., The

LINERS

Allis-Chalmers Mfg. Co., Gen. Mach. Div., Cataloged on page 9, 289-296 Alloy Steel & Metals Co., Cataloged on page 6
American Brake Shoe Co.
Amsco—see American Brake Shoe

Columet & Hecla, Inc.
Coeur d'Alene Hardware & Foundry

Coeur d'Alene Hardware & Foundry Co.
Corhart Refractories Co.
Denver Equipment Co., Cataloged on page 7
Eimen Corp., The, Cataloged on page 297-304
Electric Steel Foundry Co.
Gathe Corp., Hardinge Co., Inc., Cataloged on page 97, 103
Kennedy-Van Baun Mfg. & Eng.
Corp., Cataloged on page 201
Kensington Steel Co.
Mantioba Steel Foundries Ltd.
Marcy—see Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Marcy Mill Div., Cataloged on page 284, 285

Mine & Smette.
Marcy Mill Div.,
Marcy Mill Div.,
Miners Foundry & Mfg. Co.
Morse Bros. Machinery Co.
Pacific—see Alloy Steel & Metals
Facility Co.
Vonn Works Inc.

Procinc—see Alloy Steel & Metals
Co.
Sanford-Day Iron Works Inc.
Straub Mfg. Co., Inc.
Taylor-Wharton Iron & Steel Co.
Thomas Foundries, Inc.
Traylor Engineering & Mfg. Co.,
Cataloged on page 269-276
USS—U.S. Steel Corp.
United States Steel Export Co.,
Cataloged on page 265-268
U.S. Steel Corp., Cataloged on page
25, 253-268
Webb Corp., The
Western Foundry Co.

GRIZZLIES

See Screens, Grizzlies and Accessories

GROUTING

EQUIPMENT Gardner-Denver Co., Cataloged on page 16
Kochring Co.,
Longyear Co., E.J.,
Penndrill—ace Pennsylvania Drilling Co.,
Pennsylvania Drilling Co. ing Co.
Pennsylvania Drilling Co.
Sprague & Henwood, Inc., Cataloged on page 221-224
Tinney Drilling Co.

GUNITING

See Concreting Equipment, Underground

HARD FACING

See Welding Equipment and Supplies

HATS

See Safety Equipment

HAULAGE UNITS, OFF-RAIL

See also Truck and Trailors

See diso fruck and freilers
Allis-Chalmers Mfg. Co., Tractor
Div., Cataloged on page 14, 15
Autocar—see The White Motor Co.,
Autocar Div.
Baker Raulang Co.
Beall Pipe & Tank Corp.
Dart Truck Co.
Euclid Division General Motors
Corp., Cataloged on page 241144

Dart Truck Co.

Euclid Division General Motors

Corp., Cataloged on page 241244

F.A.B. Mfg. Co.
Fabco-see F.A.B. Mfg. Co.
Federal Motor Truck Co.
Fruchaif Trailer Co.
Fruchaif Trailer Co.
Galion Allateel Body Co.
Gate City Steel
General Motors Overseas Operations,

Cataloged on page WM 19

(World Mining Only)

Getman Brothers
Goodman Mfg. Co.
Gramm Trailer Corp.
Hell Co., The
Hercules Steel Products Corp.
Hewitt-Robins, Inc.
Hyman-Michaels Co.
International Harvester Co., Cataloged on page 31

loged on page 91
Jeffrey Mfg. Co., The, Cataloged on page 252
Joy Mfg. Co., Cataloged on page page 2 Mfg. 225-240

213-248

E13-248

Checkring Co.

Lendin Steel Co.

Lec-Norse Co.

Lec-Norse Co.

Lec-Tourneau-Westinghouse Co.

Marion Metal Products Co. The

Meyers-Whaley Co., Inc.

Pullman-Standard Car Mfg. Co.

Sanford-Day Iron Works, Inc.

Tournahopper—see LeTourneau
Westinghouse Co.

Tournaroeker—see LeTourneau
Westinghouse Co.

Webb Corp., The

Whaley—see Meyers-Whaley Co.,

Inc.

White Motor Co., Autocar, a Div. Yale and Towne Mfg. Co. Materials Handling Division

HEADFRAMES, STEEL

Allison Steel Mfg. Co., Cataloged on page 118
Bethlehem Pacific Coast Steel Corp. Bethlehem Steel Co. Bodinson Mfg. Co.
Lakeside Bridge & Steel Co.
U.S. Steel Corp.
American Bridge Div.
United States Steel Co., Cataloged on page 255-268

HEATERS

AIR

Graybar Electric Co., Inc.
Grinnell Co., Inc.
Ilg Electric Ventilating Co.
Springfield Boiler Co.
Thermolier—see Grinnell Co., Inc.
Westinghouse Electric International
Co., Cataloged on page 261-264
(World Mining Only)
Wing Mfg. Co., L.J.

SPACE

Graybar Electric Co., Inc.
Ilg Electric Ventilating Co.
Watlow Electric Mfg. Co.
Westinghouse Electric International
Co., Cataloged on page 261-264
(World Mining Only)
Wing—see Wing Mfg. Co., L.J.
Wing Mfg. Co., I.J.

HOISTING CABLE

See Rope, Wire

HOISTING COMMUNICATIONS

See Communications

HOISTING EQUIPMENT

See also Chain Hoists; Rope,

MINE SHAFT HOISTS

Coeur d'Alene—see Coeur d'Alene Hardware & Foundry Co. Coeur d'Alene Hardware & Foundry Co. Denver Equipment Co., Cataloged Denver Equipment Co., Catalogeu on page 7 Detroit Hoist & Machine Co. Hirsch Bros. Machinery Co. Holmes & Bros. Inc., Robert Jones Foundry & Machine Co., W.A. Joy Mfg. Co., Cataloged on page 275-248 Joy Mfg. Co., Cataloged on page 275-746
Kenyon Machinery Co.
Lake Shore Engineering Co.
Morse Bros. Machinery Co.
Neal Machinery Co., H.T.
Nordberg Mfg. Co., Cataloged on page 13
Rogers Iron Works Co.
Shepard Niles Crane & Hoist Corp.
Stearns Roger Mfg. Co., Catalog on page 214
Superior-Lidgerwood-Mundy Corp.
United States Steel Export Co.
Cataloged on page 265-268.
Valcan-Denver—see Vulcan Iron
Works, Denver, Colo.
Valcan Iron Works (Denver), Cataloge on page 34
Vulcan Iron Works (Pa.) Joy

SCRAPER HOISTS (slushers)

Portable Flood City—see Flood City Brass & Electric Co.
Flood City Brass & Electric Co.
Gardner-Denver Co., Cataloged on
page 16
Harnischfeger Corp., Cataloged on
page 73
Machinery Co. page 250-251
Joy Mfg. Co., Cataloged on page 250-251
Joy Mfg. Co., Cataloged on page 225-248 Lake Shore Engineering Co. Ledeen Mfg. Co., Cataloged on page R & M-see Robbins & Meyers, In Reading -see Reading Crane &

Reading — see Heading Crane & Hoist
Reading Crane & Hoist
Robbins & Meyers, Inc.
Round & Son, Inc., David
Round Chain Cos.
Round Woodhouse Chain & Mfg. Co.
Shepard Niles Crane & Hoist Corp.
Superior-Lidgerwood-Mundy Corp.
Vulcan-Denver—see Vulcan Iron
Works, Denver, Cole.
Vulcan Iron Works (Denver), Cataloged on page 84
Vulcan Iron Works (Pa.)
Webb Corp., The ading-

Stationary

Stationary
Gardner-Denver Co., Cataloged on
page 16
Harnischfezer Corp., Cataloged on
page 73
Hirsch Bros. Machinery Co.
Holmes & Bros. Inc. Robert
Ingersull-Rand Co., Cataloged on
page 230, 231
Joy Mfg. Co., Cataloged on page
225-240
Lake Shore Engineering Co. Joy Mfs. Co., Cataloged on page 225-248
Lake Shore Engineering Co.
Neal Machinery Co., H.T.
Reading—see Reading Crane & Huist
Reading Orane & Hoist
Round Chain Cos.
Round Woodhouse Chain & Mfg. Co.
Sauerman Bros. Inc., Cataloged on page 282
Shepard Niles Crane & Hoist Corp.
Superior-Lidgerwood-Mundy Corp.
Valcan-Denver see Valcan Iron
Works, Denver, Cole.
Valcan Iron Works (Denver), Cataloged on page 44
Webb Corp., The

SKIPS AND CAGES

Amsco-see American Brake Shoe Co.

Atlas Car & Mfg., Co., The, Cataloged on page 245
Card Iron Works Co., The C.S.,
Cataloged on page 246, 247
Christian Engineers, J.D.
Connellaville Mfg. & Mine Supply
Co.

Easton—see Easton Car & Construction Co.

Easton Car & Construction Co.
Gundlach Machine Co., T.J.

Helmick Foundry-Machine Co.
Hirseh Bros. Machinery Co.

Holmes & Bros. Inc., Robert

Jones Foundry & Machine Co., W.A.

Lake Shore Engineering Co.

Link-Belt—see Link-Belt Co.

Link-Belt Co., Cataleged on page

WM 76, 77 (World Mining

Only)

Miners Foundry & Mfg. Co.

Neal Machinery Co., H. T.

Nolan—see Nolan Co., The

Nolan Co., The

Rogers Iron Works Co.

Sanford-Day Iron Works Inc.

Shepard Niles Crane & Holst Corp.

Stearns Boger Mfg. Co., Cataloged

a page 21d

Stearns Boger Mfg. Co., Cataloged

page 21d

Superior-Lidgerwood-Mundy Corp.

Cataloged on page 285-268

Vulcan Denver—see Vulcan Irwn

Works, Denver, Colorado

Valcan Iron Works (Colo.), Cataloged on page 344

Vulcan Iron Works (Pa.)

HOSE

Air Reduction Sales Co.
American—see American Rubber Mfg. Co.
Marcican Rubber Mfg. Co.
Bear—see American Rubber Mfg.
Boaton Woven Hose & Rubber Co.
Carlyle Rubber Co., Inc.
Central Mine Supply Co.
Cicerratream Garden—see Yardley
Plantis Co.
Copeo Pacific, Ltd., Cataloged on page 327
Crackeriack—see American Rubber Mfg. Co.
Eimeo Corp., The, Cataloged on page 297
Sales Rubber Co., Cataloged on page 297
Goodall Rabber Co., Cataloged on page 216, 217
Goodrich Co., B. F.
Goodyser Tire & Rubber Co.
Hamilton Rubber Mfg. Corp.
Hewitt Robins, Inc., Hewitt Rubber Div.
Lee Rubber & Tire Corp., Republic Rubber Div., Cataloged on page 218
New York Belting & Packing Co.
Ploneer Rubber Mille
Porter Co., H. K.
Portovent—see Fiexanst Co., The
Quaker Rubber Mille
Porter Co., H. K.
Portovent—see Fiexanst Co., The
Quaker Rubber Co.
Raybestos—Manhattan, Inc.
Snyder & Son, Inc., M. L.
Thermoid Co., Cataloged on page
4
United States Rubber Co.
Yardley Plantics Co.

Snyder

24

United States Rubber Co.
Yardley Plastics Co.
Yosemite—see American Rubber

Mfg. Co.

HYDROSEPARATORS

See Thickeners and Tanks;

IDLERS

See Conveyor Equipment

INCREASERS, SPEED

See Speed Changers

INSTRUMENTS

See Engineering Supplies; Surveying instruments; Testing and Control Equipment

JIGS

See Concentrating Equipment

JIM CROWS

See Track and Accessories

JUMBOS

See Drills, Rock

KILNS

See Dryers and Kilns

LABORATORIES AND ASSAYERS

Arisona Assay Office
Arisona Testing Laboratories, Cataloged en page 119
Beach & Company
Bennetts Chemical Laboratory, Inc.
Black & Deasen, Cataloged en page
119
California Testing Laboratories, Inc.
Chapman and Wood
Charlton Laboratories
Colorado Assaying Co., The, Cataloged en page 119
Custom Assay Office & Laboratory
Deason & Nichola
Denver Equipment Co., Cataloged
en page 119
Dickinson Laboratories, Cataloged
en page 119
El Paso Testing Laboratories
Engineers Syndicate, Ltd., Cataloged on page 76
Geodall Bros., Cataloged en page
119
Hanks, Inc., Abbot A., Cataloged 119
Hanks, Inc., Abbot A., Cataloged on page 19
Hawley & Hawley, Cataloged on page 119
Hill & Jude, Assayers
Ledoux & Co., Cataloged on page
Mills & Fortgoening Co. Ledoux & Co., Cataloged en page 119
Minerals Engineering Co.
Minerals Laboratory Co.
Minerals Laboratory Pitkin, Inc., Lucius
Root & Simpson, Inc.
Sadtler & Son, Inc. Samuel P.
Smith-Emery Co., Cataloged an page 119
Snell Inc., Foster D.,
Snyder's Mine & Chemical Laboratories
Stearns Magnetic, Inc., Cataloged on page 209
Stowell & Co., W. H.
Twining Laboratories
Walker & Whyte, Inc.
Wood Assaying Co., Henry E., Cataloged on page 119

LABORATORY **EQUIPMENT AND**

SUPPLIES

See also Reagents and Chemicals

LABORATORY AND TESTING MACHINES

Agitair—see Galigher Co., The Answorth & Sons, Inc., Wm. American Instrument Co., Inc. American Pulveriser Co. Brabender Corp. Beckman Instruments, Inc. Bico, Inc. Beckman Instruments, and Bleo, Inc.
Bleo, Inc.
Booth—see Booth Engineers
Booth Engineers
Burrell Corp.
Central Scientific Co.
Coleman Instruments, Inc.
Detactron Corp.
DFC—see Denver Fire Clay Co., The
Denver Fire Clay Co., The, Cataon page 7

Pup Reactor—see Enley Products, Inc.
Shrader Co., F. W.
Torsion Balance Co., The
Turbo Mill Co.
Tyler Co., The W. S., Cataloged on
page 288
Universal Engineering Corp.
Universal Vibrating Screen Co.
Voland & Sons, Inc.
Wemco—see Western Machinery Co.
Western Machinery Co., Cataloged
on page Inside Back Cover

MISCELLANEOUS LABORATORY SUPPLIES

Bausch & Lomb Optical Co.
Beckman Instruments, Inc.
Burrell Corp.
Cargille Laboratories, Inc., R. P.
Central Scientific Co.
Combustion Engineering—Superheater, Inc., Raymond Pulverizer Div.
DFC—see Denver Fire Clay Co., The
Denver Equipment Co., Catalogue

heater, Inc., Raymond Pulverlare Div.

DFC—see Denver Fire Clay Co., The
Denver Equipment Co., Cataloged
on page 7
Denver Fire Clay Co., The, Cataloged on page 286
Dictert Co., Harry W.
Engineers Syndicate, Ltd., Cataloged on page 76
Fischer & Porter Co.
Frantz Co., Inc., S. G.
H-B Instrument Co., Inc.
Harper Electric Furnace Corp.
Hevi Duty Electric Co.
Holmes & Broa., Inc., Rohert
Majee, Inc.
Mine & Smelter Supply Co., The
Marcy Mill Div., Cataloged en
page 284, 285
North American Phillips Co.
Snyder & Son, Inc., M. L.
Southwestern Engineering Co., Cataloged on page 287
Sturievant Mill Co., Cataloged on
page WM 81 (World Mining)
Torsion Balance Co., The

page WM 81 (World Mining Only) Torsion Balance Co., The Tyler Co., The W. S., Cataloged on page 288 Ultra-Violet Products, Inc., Cata-loged on page 68

LACING, BELT

Soo Fasteners, Belt

LAMPS, MINER

See Safety Equipment

LIGHT PLANTS See Electrical Equipment

LIGHTS

See Safety Equipment

LINERS

See Grinding Equipment

Manufacturer's Complete Names and Addresses are listed in Section II, last pages of this yellow section.

END AND OVERHEAD

Allis-Chalmers Manufacturing Co., Tractor Div., Cataloged on page 14, 15

Denver Fire Clay Co., The, Cataloged on page 284
Eberbach Corp.
El-Tronies, Inc.
Engineers Syndicate, Ltd., Cataloged on page 78, 163
Hardinge Co., Inc., Cataloged on page 97, 163
Holmes & Broa., Inc., Robert
Mine & Smelter Supply Co., The,
Cataloged on page 284, 285
Minerais et Metaux, Cataloged on page 98 WM 24 (World Mining Orsley)
Morse Broa. Machinery Co.
Nuclear Instrument & Chemical
Corp.
Porter Co., Inc., H. K., WatsonStillman Co., The-, a Div.
Pulva Corp.
Pulva Sizer—see Pulva Corp.
Pulva-Sizer—see Pulva Corp.
Pulva-Sizer—see Enley Products,
Inc.
Shrader Co., F. W.

Allis-Chalmers Manufacturing Co.,
Tractor Div., Cataloged on page
14, 18
American Brake Shoe Co.
Amsco-see American Brake Shoe
Co.
Athey Products Corp.
Bucyrus-Erle — see International
Harvester Export Co.
Caterpillar Tractor Co.
Drott—see Drott Mfg. Corp.
Brott Mfg. Corp.
Brott Mfg. Corp.
Brott Mfg. Corp.
Brott Mfg. Corp.
Cataloged on page 397-384
Goodman Mfg. Co.
Hough Co., The Frank G.
Hyman-Michaela Co.
International Harvester Export Co.,
Cataloged on page 91
Jeffrey Mfg. Co., The, Cataloged on page 252
Joy Mfg. Co., Cataloged on page 252
Joy Mfg. Co., Cataloged on page 252
Joy Mfg. Co., Cataloged on page 252
Long Co., The
Mennedy-Van Saun Mfg. & Eng.
Corp., Cataloged on page 250
Kensington Steel Co.
Long Co., The
Myers-Whaley Co., Inc.
Oliver Corp., The
Payloader—see Hough Co., The
Frank G.
Service Supply Co.
Skid-Shovel—see Drott Mfg. Corp.
Whaley—see Myers-Whaley Co., Inc.
RAIL (Mucking Machines)

RAIL (Mucking Machines) American Brake Shoe Co. Amsco-see American Brake Shoe American Brake Shoe Co.

Clarkson Mfg. Co.
Clarkson Mfg. Co.
Conway Shovel—see Goodman Mfg.
Co.
Eimeo Corp., The, Cataloged en
page 297-304
Gardner-Denver Co., Cataloged en
page 186
Goodman Mfg. Co.
Joy Mfg. Co., Cataloged en page
225-248
Rennedy-Van Saun Mfg. & Eng.
Corp., Cataloged on page 291
Lohite—see Joy Mfg. Co.
Longyear Co., E. J.
Meyers-Whaley Co., Inc.
Neal Machinery Co., Inc.
Neal Machinery Co., Inc.
Neal Machinery Co., Inc.
Redbird—see Clarkson Mfg. Co.
Whaley—see Myers-Whaley Co., Inc.

RUBBER TIRED

RUBBER TIRED

American Tractor Equipment Corp. Clark Equipment Co., Construction Machinery Div. Clarkson Mfg. Co., Cataloged on page 118

Dempater Brothers, Inc. Dempater-Digrater—see Dempeter Brothers, Inc. Hough—see International Harvester Export Co., Cataloged on page 218, 249

Mchigan—see Clark Equipment Co. Minneapolis-Modine Co. Oliver Corp., The Petithone Mulliken Corp. Tracton-Loader—see Clarkson Mfg. Co. Tracton-Loader—see Tractomotive Corp. Tractomotive Corp. Westinghouse Air Brake Co.—see Le Roi Co., Cataloged on page 248, 249

Westinghouse Air Brake Co.—see Le Roi Co., Cataloged on page 248, 249

LOCOMOTIVES

BATTERY
Atlas Car & Mrg. Co., The, Cataloged on page 345
Baldwin-Lima-Hamilton Cerp., Cataloged on page 346
Goodman Mrg. Co., Mancha Storage
Battery Locomotive Div.
Greensburg Machine Co., Cataloged
on page 34
Hyman-Michaels Co.
International General Electric Co.,
Cataloged on page Inside Front
Cover (World Mining Only)
Ironton Engine Co., The

Jeffrey Mfg. Co., The, Cataloged on page 252 page 252 cha-see Goodman Mfg. Co., Mancha Storage Battery Loco-motive Div.

motive Div.

Miners Foundry & Mfg. Co.

Morse Bros. Machinery Co.

Neal Machinery Co., H. T.

Yulean Iron Works (Pa.)

Westinghouse Electric Corp.

Westinghouse Electric International

Co., Cataloged on page 261-264

(World Mining Only)

COMPRESSED AIR

Rimco Corp., The, Cataloged on page 297-304 Noal Machinery Co., H. T. Universal Dredge Mfg. Co., Cata-loged on page 66 Universal Tramaire—see Universal Dredge Mfg. Co.

DIESEL

DHSLI

American Locomotive Co.
Brookville Locomotive Works
Davenport—see Davenport Bealer
Corp.
Davenport Bealer Corp.
Elimeo Corp., The, Cataloged en
page 297-384
Pate-Root-Heath Co., The
General Motors Overseas Operations, Cataloged on page WM 19
(World Mining Only)
Goodman Manufacturing Co., Mancha Storage Battery Locomotive Div.

(World Mining Only)
Goodman Manufacturing Co., Mancha Storage Battery Locomocive Div.
Hyman-Michaels Co.
International General Electric Co.,
Cataloged on page Inside Frent
Cover (World Mining Only)
Mancha-see Goodman Mfg. Co.,
Mancha Storage Battery Locomotive Div.
Pressed Steel Car Co., Inc., Cataloged on page WM 99 (World
Mining Only)
Ruth Co., The
Universal Dredge Mfg. Co., Cataloged on page 66
Universal—see Universal Dredge
Mfg. Co.
Vulcan Iron Works (Pa.)
Westinghouse Electric Corp.

DIESEL-ELECTRIC Atlas Car & Mfg. Co., The, Cata-loged on page 245
Baldwin-Lima-Hamilton Corp., Ed-dystone Div., Cataloged on page 10

dysions Div., Cataloged en page
18
Davenport—see Davenport Besler
Corp.
Davenport Besler Corp.
Davenport Besler Corp.
Differential Steel Car Ce., Cataloged on page 81
Fate-Root-Heath Co., The
General Motors Overseas Operations,
Cataloged on page WM 19
(World Mining Only)
Greensburg Machine Ce., Cataloged
on page 94
Hyman-Michaele Co.
Neal Machinery Co., H. T.
Firmouth—see Fate-Root-Heath Co.,
The
Pressed Steel Car Co., Inc., Cataloged on page WM 98 (World
Mining Only)
Vulcan Iron Works (Pa.)

TROLLEY

Differential Ricel Car Ca., Cataloged on page 51
Goodman Manufacturing Co.
International General Electric Ca.,
Cataloged on page Inside Front
Cover (World Mining Only)
Joffrey Mgs. Co., The, Cataloged on
page 253
Morse Broa. Machinery Co.,
Neal Machinery Co., H. T.
Vulcan Iron Works (Pa.)
Wostinghouse Electric International Co., Cataloged on page 251264 (World Mining Only)

LOG WASHERS

See Washers

LUBRICANTS

AP 5-see Jet-Lube Inc. Atlantic Refining Co., The

CR—see Jet-Lube Inc.
California Texas Oil Co., Ltd.
Caloi-see Standard Oil Co. of Calif.
Chatillon & Sons, John
Dixon Crueible Co., Joseph
Drullard Co., Howard
Esso Standard Oil Co.
Flake Bros. Refining Co., Labriplate Div.
Gulf Oil Corp., Gulf Refining Co.
Houghton & Co., E. F.
Jet-Lube Inc.
Keystone Lubricating Co.
Kopr-Kote-see Jet-Lube Inc.
Lead-Cote-see Drullard Co.,
Howard
Lubri-Tasgon—see Cabot, Inc. Samuel
Lubri-Tasgon—see Ohio Grease Co.,

uel
Lubricream—see Ohio Grease Co.,
The
Lubriplate—see Fiske Bros. Refining Co., Lubriplate Div.
Macmillan Petroleum Corp.
Motul—see Ewan-Fineh Oil Corp.
N.Y. & N.J. Lubricant Co.
Ohio—see Ohio Grease Co., The
Ohio Grease Co., The
Oronite Chemical Co.
Perma-Fill—see Jet-Lube Inc.
Rezistolube—see Sahara Oil Co.
Rezistolube—see Sahara Oil Corp.
Sahara Oil Co.
Shell Oil Co.
Shell Oil Co.
Standard—see Standard Oil Company (Indiana)
Standard Oil Company (Indiana)
Standard Oil Company (Indiana)
Standard Oil Company (Indiana)
Cataloged on page 17
Swan-Fineh Oil Corp.
Texas Co.
Tide Water Associated Oil Co. Lubricream see Ohio Greace Co.,

Swan-Finch Oil Corp.
Texas Co.
Tide Water Associated Oil Co.
Tycol—see Tide Water Associated
Oil Co.
Union Oil Co. of California
Valvoline Oil Co.
Vi.—see Jet-Lube Inc.
WOW—see Waverly Oil Works Co.,
The
Waverly Oil Works Co., The
Wright December Saw
and Tool Corp.
Wright Power Saw and Tool Corp.

MACHINE SHOP EQUIPMENT

See Sharpeners

MAGNETIC EQUIPMENT

HEAD PULLEYS AND Suspension Magnets
Cutler-Hammer, Ine.
Dings Magnetie Separator Ca.,
Cataloged on page 27
Eries Mg. Co.
Homer—see Homer Manufacturing Eries Mfg. Co.

Homer—eee Homer Manufacturing
Co., The
Homer Mfg. Co., The
Jeffrey Mfg. Co., The, Cataloged on
page 231
Magnetic Engineering & Mfg Co.
Memoo—see Magnetic Engineering &
Mfg. Co.
Ohio Electric Mfg. Co.
Shrader Co., F. W.
Btearns Magnetic, Inc., Cataloged on
page 249
Thumes Mck. Vaerkuted, A.S.

SEPARATORS SUPARATORS
Dings Magnetic Separator Ca., Cataloged on page 27
Engineers Syndicate, Ltd., Cataloged on page 76
Erica Mfg. Co.
Exolon—see Exolon Co., The
Exolon Co., The
Ferro Filter—see Frants Co., Inc.,
S.G. Frants Co. Inc., S.G. General Electric Co., Carbolov Dept. Homer—see Homer Mfg. Co., The Homer Mfg. Co., The Magnafio—see U. S. Hoffman Mehy. Homer Mfg. Co.,
Homer Mfg. Co.,
Magnaflo-see U. S. Hoffman
Magnaflo-see U. S. Hoffman
Cor,
Corp.
Jeffrey-Steffensen—see Jeffrey Mfg.
Co., The

Jeffrey Mfg. Co., The, Cataloged on page 252
Magnetic Engineering & Mfg. Co. Memco-see Magnetic Engineering & Mfg. Co. Recoveries, Inc.
Btearns Magnetic, Inc., Cataloged on page 269
Shrader Co., F.W. Thumes Mck. Vaerksted, A.S. U.S. Hoffman Mchy. Corp.

MILL DESIGN

See Plant Design and Construction

MINE CARS

See Cars, Mine

MINE DOORS

See Doors, Mine

MINE SAFETY EQUIPMENT

See Safety Equipment

MONITORS (HYDRAULIC)

Georgia Iron Works Co.
Hydraulic Supply Mfg. Co.
Intelligiant—see Intelligiant Corp., Cataloged on
page 11
Yuba Mfg. Co., Cataloged en page
79

MOTORS

See also Engines; Electrical Equipment

AIR MOTORS

Alk MOTORS
Chicago Pneumatic Tool Co.
Coppus Engineering Corp.,
Elmee Corp., The, Cataloged en
page 297-304
Gardner-Denver Co., Cataloged en Eimee Corp., The, Cataloged on page 297-304 Gardner-Denver Co., Cataloged on page 18 Graybar Electric Co., Inc. Holman Brothers (Canada) Ltd. Ingersoll-Rand Co., Cataloged en page 250, 251
Joy Mfg. Co., Cataloged on page 225-240
Ledeen Mfg. Co., Cataloged en page 44

64
Mine & Smelter Supply Co., The
Marcy Mill Div., Cataloged on
page 284, 285
Pistonair—see Joy Mfg. Co.
Thor—see Thor Power Tool Co.
Thor Power Tool Co., Cataloged on
page WM 22 (World Mining Only) page Only) binair--see Joy Mfg. Co.

GEAR MOTORS
Allia Co., The Louis
Allia-Chalmers Mfg. Co., Gen.,
Machy. Div., Cataloged en page
9, 289-296

9, 289-294 Over Control of the Contr

Falk Corp., The, Cataloged en page 277-286
Foote-Bros., Louis Alls—see Foote-Bros. Gear & Machine Corp.
Foote-Bros. Gear & Machine Corp.
Foote-Bros. Gear & Machine Corp.
Foote-Bros. Gear & Machine Corp.
Foote-Bros. Gear & Machine Corp.
Foote-Bros. Gear & Machine Corp.
Gardner-Denver Co., Inc.
Ideal Electric & Mfg. Co.
International General Electric Co.,
International General Electric Co.,
Cataloged on page Inside Front
Cover (Werld Mining Only)
Lima—see Lima Electric Motor Co., The
Link-Beit—see Link-Beit Co.
Lima Electric Motor Co., The
Link-Beit Co., Cataloged on page
WM 76, 77 (World Mining
Only)
Marathon Electric Mfg. Corp.

Mastern Electric Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Marcy Mill Div., Cataloged on page
284, 285
Metoreducers—see Falk Cerp., The
Northwestern Electric Co.
Facific Gear & Tool Works, Inc.
Philadelphia Gear Works, Inc.
Philadelphia Gear Works, Inc.
Reliance—see Reliance Electric &
Engineering Co.
Rito-Lo-Speed—see Christian Engineers, J.D.
Sterling Electric Motors, Inc.
Syncogear—see U.S. Electrical Motors, Inc.
U.S. Electrical Motors, Inc.
Webb Corp., The
Western Gear Works
Western Gear Works
Western Gear Works
Westinghouse Electric International
Co., Cataloged on page 261-284
(World Mining Only)
HYDRAUUC MOTORS

(World Mining Only)

HYDRAULIC MOTORS

Berry—see Oliver Iron & Steel
Corp.

Elliott Co., Crocker-Wheeler Div.
Link-Belt—see Link-Belt Co.
Link-Belt Co., Cataloged on page
WM 76, 77 (World Mining
Only)
Oligear Co., The
Oliver Iron & Steel Corp.
Schroeder Bros.

MUCKING MACHINES

See Loaders; Shaft Sinking

NOZZLES

See Screens, Grixxies and

OILERS, AIR LINE

Chicago Pneumatic Tool Co.
Copes Pacific Ltd., Cataloged on
page 53
Drullard Co., Howard
Gardner-Denver Co., Cataloged on
page 18
Ingersoll-Rand Co., Cataloged on
page 286, 281
Joy Mfg Co., Cataloged on page
225-24
Thor-see Thor Power Tool Co.
Thor Power Tool Co., Cataloged on
page WM 23 (World Mining
Only) page WM 23 (World Mining Only)
Victor Equipment Co.
Wright—see Wright Power Saw & Tool Corp.
Wright Power Saw & Tool Corp.

See Lubricants; Reagents and Chamicals

ORE BUYERS

See Buyers

OXYGEN BREATHING APPARATUS

See Safety Equipment

PACKING

Belmont Packing & Rubber Co., The
Boston Woven Hose & Rubber Co.
Felt Products Mfg. Co.
Garlock Packing Co., The
Gathe Corp.
Goodall Rubber Co., Cataloged on
page 216, 217
Giant Seal—see New York Belting
& Packing Co.
Greene, Tweed & Co.
Hamilton Rubber Mfg. Corp.
Hewitt-Robins, Inc.
Houghton & Co., E.F.
Johns. Manville
Lee Rubber & Tire Corp., Republic
Rubber Div., Cataloged on page
218
New York Belting & Packing Co.

Palmetto—see Greene Tweed & Co. Pioneer Rubber Mills Raybestos-Manha tan, Inc. Schieren Co., Chess. A. Sayder & Son, Inc. M.L. United States Rubber Co.

PIPE AND FITTINGS

See also Couplings

ASBESTOS Johns-Manville Transite—see Johns-Manville

CAST AND STEEL

CAST AND STEEL

Allegheny Ludlum Steel Corp.
Allegheny Metal—ace Allegheny
Ludlum Steel Corp.
Beall Pipe & Tank Corp.
Beall Pipe & Tank Corp.
Bethlehem Pacific Coast Steel Corp.
Bethlehem Steel Co.
CW—see National Supply Co., The
Clow & Sons, James B.
Cranc Co.
Electric Steel Foundry Co.
Foater Co., L.B.
G—see Grinnell Co., Inc.
Goyne Steam Pump Co.
Grinnell Co., Inc.
Hydraulic Supply Mfg. Co.
Michigan Pipe Co.
Michigan Pipe Co.
Michigan Pipe Co.
Michigan Pipe Co.
Mine & Smelter Supply Co., The
Marcy Mill Div., Cataloged on
page 284, 285
National Supply Co., The
Republic—see Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel Corp.
Republic Steel

The The Stainless Welded Products, Inc. Swepco-see Stainless Welded Products. The Taylor Forge & Pipe Works United States Pipe & Foundry Co. United States Steel Export Co., Cataloged on page 265-368 Victaulic—see Victaulic Co. of America
Victaulic Co. of America
Western Foundry Co.

COPPER, BRASS AND BRONZE

COPPER, BRASS AND BRONZE
AMPCO Metal, Inc.
Bridgeport Brass Co.
Chase Brass & Copper Co.
Crane Co.
G-see Grinnell Co., Inc.
Goyne Steam Pump Co.
Grinnell Co., Inc.
Mine & Smelter Supply Co., The
Marcy Mill Div., Cataloged on
page 284, 285
Revere Copper & Brass Inc.
Schalble Co., The

PLASTIC

PLASTIC
Carlon Products Corp.
Clearstream—see Yardley Plasties
Oa.
Crane Co.
Foster Co., L.B.
Hamilton Rubber Mfg. Corp.
Indestructible—see New York Belting & Packing Co.
Minnesota Mining & Mfg. Co.,
Irvington Varnsh & Insulstor,
a Div.
New York Belting & Packing Co.
Republic—see Republic Steel Corp.
Republic Steel Corp.
Ryerson & Son, Inc., Joseph T.
United States Rubber Co.
Yardley Plastics Co.

RUBBER LINED Beall Pipe & Tank Corp.

Gates Rubber Co., Cataloged on EQUIPMENT Gates Rabber Co., Cataloged on page 20
Goodall Rabber Co., Cataloged on See Exploration Equipm page 216, 217
Hydraulic Supply Mfg. Co.
Michigan Pipe Co.
New York Belting & Packing Co.
New York Belting & Packing Co.
PULLEYS
See also Magnetic Equipmental Co.
Victaulic—see Victaulic Co.

American Brake Shoe Co.
American Brake Shoe Co. America Victaulic Co. of America

STEEL, SPIRAL-WELDED Naylor Pipe Co., Pacific Pipe Co., Cataloged on page 68

Arrow-see Arrow Tank Company, Inc.
Acme Tank Mfg. Co.
Arrow Tank Company Inc.

Atlantic Tank Corporation
Brooks, see Brooks Lumber Co.
Brooks Lumber Co.
Brooks Lumber Co.
Pederal Pipe & Tank Co., Cataloged
on page 118
Goyne Steam Fump Co.
Michigan Pipe Co.
National Tank & Pipe Co.
Pacific Wood Tank Corp., Cataloged on page 105
Sutphen, Peter O.

PLANT DESIGN AND CONSTRUCTION

VALVES-see VALVES

Allen and Garcia Co.
Booth—see Booth Engineers Allen and University
Booth—see Booth Engineers
Booth Engineers
Chapman and Wood
Convair, Inc.
Davis Co., Nelson L.
Davis Co., Nelson L.
Denver Equipment Ce., Cataloged
on page 7
Dorr Ce., The, Cataloged on page

I2
Engineers Syndicate, Ltd., Cataloged on page 76
Foater Wheeler Corp.
Hack Engineering Co.
Heyl & Patterson, Inc.
Johnson Co., The R.G.
Lakeside Bridge & Steel Co.
Link-Belt Co., Cataloged on page
WM 78, 77 (World Mining
Only)
Miller, Arnold H., Cataloged on

Only)

Only)

Miller, Arnold H., Cataloged on page 119

Minerals et Metanx, Cataloged on page WM 24 (World Mining)

Only)

Minerals Engineering Co. (Colo.)

Nichols Engineering & Research

Corp.

Smith Engineering Works

Snell Inc., Foster D.

Southwestern Engineering Co.,

Cataloged on page 287

Stearns Reger Mfg. Co., Cataloged on page 214

Bill, Arthur R., Cataloged on page 119

Telluride Iron Works Co.

119
Telluride Iron Works Co.
United States Steel Expert Cs.,
Cataloged on page 265-268
Universal Engineering Corp.
Walvoord, Inc., O.W.
Western Knapp Engineering Co.

PNEUMATIC TOOLS

See Tools, Air Driven

POSTS

See Arms and Posts

POWDER

See Blasting Supplies

PRESERVATIVES

See Reagents and Chemicals

PROSPECTING

See also Magnetic Equipment American Brake Shoe Co. American Pulley Co., The Amsoo—see American Brake Shoe Co. Bodinson Mfg. Co.

Bonded—see Bonded Scale and Machine Co.
Chicago Pulley & Shafting Co.
Christian Engineers, J.D.
Continental Gin Co., Industrial Div.
Daggett—see Chicago Pulley & Shafting Co.
Dick Co., Inc., R. & J.,
Dobbie Foundry & Machine Co.
Gates Rubber Co., Cataleged on page 20
Hewitt-Robins, Inc.

26
Hewitt-Robins, Inc.
Hirsch Bros. Machinery Co.
Holmes & Bros., Inc., Robert
Iowa Mfg. Co., Cataloged on page

197
Jeffrey Mfg. Co., The, Cataloged on page 252
Jones Foundry & Machine Co., W.A.
Link-Beit-ese Link-Beit Ce.
Link-Beit Co., Cataloged on page WM 75, 77 (World Mining Only)

WM 76, 77 (World Mining Only)
Lippmann Engineering Works
Marco—see Marsh Engineering Co.,
E.F.
Marsh Engineering Co., E.F.
Palmer-Bee Co.
Reeves Pulley Co.
Rogers Iron Works Co.
Sanford-Day-Iron Works Inc.
Sprout. Waldron & Co., Inc.
Stearns Magnetic, Inc., Cataloged
on page 269
Stephens-Adamson Mfg. Co., Cataloged on page 262
Telluride Iron Works Co.
Webb Corp., The
Weds-Gripp, see Christian Engineers, J.D.
western Foundry Co.
Western Foundry Co.
Western Gear Works

19

PULVERIZERS

See Crushers PUMPS

ACID
Allen-Sherman-Hoff Pump Co., The,
Cataloged on page Inside Front
Cover
Allie-Chalmers Mfg. Co., Gen.
Machy, Div., Cataloged en page
9, 289-296
American Brake Shoe Co.
American Hard Rubber Co.
AMPCO Metal, Inc.
Amsco-see American Brake Shoe
Co.
Arco-see Aurore Description

Co.
Arco-see Aurora Pump Co.
Aurora Pump Co.
Bingham Pump Co.
Bingham Pump Co.
Brown-Fayro Co.
Centriacal—see The Allen-ShermanHoff Pump Co.
Cocur d'Alene Hardware & Foundry Co.

Hoff Pump Court d'Alene Hardware & Foundry Co.
Deming Co.
Denver Equipment Co., Cataloged on page 7
Duriron Co., Inc., The
Electric Steel Foundry Co.
Telebanks Morse & Co. Fairbanks, Morse & Co.
Food Machinery & Chemical Corp.
Peerless Pump Div.
Galigher Co., The, Cataloged on
page 87

page 87
Galigher Sump Pump—see Galigher
Co., The
Gardner-Denver Co., Cataloged on
page 16
Goulds Pumps, Inc.
Hydroseal—see The Allen-ShermanHoff Pump Co.
Ingersol-Rand Co., Cataloged on
page 259, 251

LaBour Co. Lawrence Pumps Inc.
Lawrence Pump & Engine Co.
Moyno—see Robins & Myers, Inc. Nagle Pumps, Inc.
Olivito—see Oliver United Filters,
Inc.

Oliver United Filters Inc.
Robbins & Myers, Inc.
Shriver & Co., Inc., T.
Vacseal-see Galigher Co., The
Warren—see Warren Steam Pump
Co., Inc.
Warren-Quinby—see Warren Steam
Pump Co., Inc.
Warren Steam Pump Co., Inc.
Warren Steam Pump Co., Inc.
Warren Steam Pump Co., Inc.
Warren Steam Pump Co., Inc.
Warren Steam Pump Co., Inc.
Warren Steam Pump Co., Inc.
Warren Steam Pump Co., Inc.
Warren Steam Pump Co., Inc.
Warren Steam Pump Co., Inc.
Warren Steam Pump Co., Inc.
Warren Steam Pump Co., Inc., A.R., Cataloged on page Outside Back
Cover

AIR DRIVEN

AIR DRIVEN
Copeo Pacific, Ltd., Cataloged on
page 51
Crowell Manufacturing Co.
Gardner-Deuver Co., Cataloged on
page 1
Ingersol Rand Co., Cataloged on
page 250, 251
Kennedy-Van Saun Mfg. & Eng.
Corp., Cataloged on page 261
Lawrence Pumps Inc.
Ledeen Mfg. Co., Cataloged on page
Porter, H.K., Watson-Stillman Co. Forter, H.K., Watson-Stillman Co., The, a Div. of Thor—see Ther Power Tool Co. Ther Power Tool Co., Cataloged on page WM 22 (World Mining Only) Only)
Warren—see Warren Steam Pump
Co., Ins.
Warren-Quinby—see Warren Steam
Pump Co., Inc.
Warren Steam Pump Co., Inc.

MINE AND DEEP WELL Allis-Chalmers Mfg. Co., Gen Machy. Div., Cataloged on pag 9, 289-296 American Brake Shoe Co. Amaco-see American Brake Sho Co.

Amsco—see American Brake Shoe Co.
Aurora—see Aurora Pump Co.
Aurora Pump Co.
Barrett, Haentiens & Co.
Brown-Fayro Co., The
Byron-Jackson Co.
Gardner-Denver Co., Cataloged en
page 16
Gorman-Rupp Co., The
Gorne Steam Pump Co.,
Ingersoll-Rand Co., Cataloged en
page 289, 251
Jacussi Bros., Inc.
Johnston Pump Co.
Kennedy-Van Baun Mfg. & Eng.
Corp., Cataloged on page 281
Lawrence Pumps, Inc.
Manistee Iron Works
Neal Machinery Co., H.T.

Neal Machinery Co., H.T.
Peerless Pump Div.
Pennsylvania Pump & Compressor
Co. Co.
Warren—see Warren Steam Pump
Co., Inc.
Warren-Quinby—see Warren Steam
Pump Co., Inc.
Warren Steam Pump Co., Inc.

Webb Corp., The Worthington Corp.

SAND AND SLIME

Allen-Sherman-Hoff Pump Co., The, Cataloged on page Inside Pront Caver
Allis-Chalmers Mfg. Co., Gen. Machy. Div., Cataloged on page 9, 289-256

American Brake Shoe Co. Amaco-see American Brake Shoe

Barrett, Haentjens & Co.

Barrett, Haentjens & Co.
Bodinson Mfg. Co.
Byron Jackson Co.
Cantriseal—see The Allen-ShermanHeff Pump Ce.
Coeur d'Alene Hardware & Foundry Co.
Dagley Manufacturing Co.
Denver Equipment Co., Cataloged
on page 7
Food Machinery & Chemical Corp.
Peerless Pump Div.
Galigher Co., The, Cataloged on
page 87
Galigher Sump Pump—see Gafigher

page 87
Galigher Sump Pump—see Galigher Co., The
Georgia Iron Works Co.,
Gorman-Rupp Co., The
Goyne Steam Pump Co.
Hydroseal—see The Allen-ShermanHoff Pump Co.
International Combustion Ltd.,
Cataloged on page WM 23
(World Mining Only)

Manufacturer's Complete Names and Addresses are listed in Section II, last pages of this yellow section.

Pyrometallurgical Equipment-

ston Pump Co Journation Framp Co.
MacClatchie Mfg. Co.
Marclatchie Mfg. Co.
Merris Mackine Works, Cataloged
on page 386, 397
Morse Bros. Machinery Co.
Nagle Pumpe, Inc.
O.J.S.—see Oliver United Filters O.D.S.—see Uliver Inc.
Inc.
Oliver United Filters Inc.
Swett Iron Works, A.L.
Telluride Iron Works Co.
Thomas Foundries, Inc.
Vacacal—see Galigher Co., The
Vacacal—see International Combustion Ltd.
Wemco—see Western Machinery Western Machinery Co., Cataloged on page Inside Back Cover Wilfley & Sons Inc., Cataloged on page Outside Back Cover Worthington Corp., Yuba Mfg. Co., Cataloged on page 79

VACUUM

Allie-Chalmers Mfg. Co., Gen. Machy. Div., Cataloged on page \$, 285-196
Barrett, Haentlens & Co. Central Seientific Co. Chicago Pneumatic Tool Co. Crowell Manufacturing Co. Dagley Manufacturing Co. Denver Reuipment Co., Cataloged on page 16
Ingersoll-Rand Co., Cataloged on page 16
Ingersoll-Rand Co., Cataloged on page 259, 251
Kennedy-Van Samh Mfg. & Rag. Corp., Cataloged on page 391
Morse Bros. Machinery Co. Moyno—see Robbins & Myers, Inc. Oliver—acc Oliver United Filters Inc. Pennsylvania Pump & Compressor Co. Robbins & Myers, Inc. Robbins & Myers, Inc.
Roots—see Roots-Connersville Blow-Roots-Connersville Blower Worthington Corp.

PYRO-

METALLURGICAL

EQUIPMENT

See also Laboratory Equipment, Supplies and Services; Sintering Machines; Dryers and Kilns

ROASTING FURNACES

Allis-Chalmers Mfg. Co., Gen. Ma-chy. Div., Cataloged on page 5, 285-236

Bethlebem Foundry & Machine Co. Colorado Iron Works Co., Cataloged on page 384, 285

Denver Equipment Co., Cataloged on page 7 page 7 r Co., The, Cataloged on page Dorrector Dorr Co., The Hardinge Co., Inc., Cataloged on page 97, 103
Harper Electric Furnace Corp. Mace—see Mace Co., The Mace Co., The, Cataloged on page 1510 Mine & Smelter Supply Co., The Marcy Mill Div., Cataloged on page 284, 385 Nichola Engineering & Research Nichols Engineering & Research
Corp.

Nichols Herreschoff—see Nichols
Engineering & Research
Pacific Poundry Co. Ltd., Cataloged
on page 105
Pollock Co., The William B.
Skinner—see Colorado Iron Works
Co.
Stearns-Roger Mfg. Co., Cataloged
on page 214
United Jron Works Co.
Webb Corp., The

SMILTING FURNACES

Allis-Chalmers Mfg. Co., Gen. Macby. Div., Cataloged on page 9, 289-296 Elektrokemisk A.S.

Elken—see Elektrokemisk A.S. Heroult Electric Furnace—see U.S. Steel Export Co. Lindbergh Engr. Co., Fisher Fur-nace Div. Mace Co., The Mace Co., The Mace Co., The, Cataloged on page

Mine & Smolter Supply Co., The
Marcy Mill Div., Cataloged en
page 284, 285
Pittsburgh Lectromeit Furnace
Corp., Cataloged on page 70
Pollock Co., The William B.
Tysland-Hole — see Elektrokemisk
LA. 8.

U.S. Smelting Furnace Co.
United States Steel Export Co.
Cataloged on page 265-255
Webb Corp., The

RADIO SYSTEMS

See Communications

RAIL, MINE

See Track and Accessories

REAGENTS AND CHEMICALS

See also Laboratory Equipment and Supplies

CYANIDE

Allied Chemical & Dye Corp., General Chemical Div.

American Cyanamid Company
Mineral Dressing Div., Cataloged on page 123

Denver Equipment Co., Cataloged on page 7

du Pont de Nemours & Co., E.L.
Electrochemicals Dept.,
Van Waters & Rogers Inc., Cataloged on page 119

FLOTATION REAGENTS American Cyanamid Company Mineral Dressing Dept., Cata-loged en page 123 Armaca—see Armour Chemical Divi-Armaca—see Armour Chemical Division
Armour Chemical Division
Atlas Powder Co.
Denver Equipment Co., Cataloged
on page 7
Dow Chemical Co., The, Cataloged
on page 13
Emery Industries, Inc.
Hercules Powder Co.
Koppers Co., Inc.—Wood Preserving Div.
Mallicakrodt Chemical Works
Motao—see Philadelphia Quarts Co.
Newport Industries, Inc.
Oronite Chemical Co.
Pol-see Philadelphia Quarts Co.
Philadelphia Quarts Co.
Philadelphia Quarts Co.
Pentasol—see Sharples Chemicals
Inc. Pentasol—see Sharples Chemicals Inc. Petroflots—see Sonneborn Sons, Inc. L. Reilly Tar & Chemical Corp. Sharples Chemicals Inc. Sonneborn Sons, Inc., L. Stein, Hall & Co., Inc., Van Waters & Rogers Inc., Cataloged on page 119

PRESERVATIVES. TIMBER

Allied Chemical & Dye Corp., Barrett Div.
American Lumber & Treating Co.
Avenarius Carbolineum—see Carbolineum Wood Preserving Co.
C-A—see C-A Wood Preserver Co.
Carbolineum Wood Preserving Co.
Carbolineum Wood Preserving Co.
Carbolineum Wood Preserving Co.
Carbolineum Wood Preserving Co.
Cuprinol—see Cuprinol Div., Darworth Inc.
Dew Chemical Co., The, Cataloged en page 12
Gilbreath Chemical Co.
Koppers Co., Inc. Wood Preserving Div.
Oronite Chemical Co.
Cemose Wood Preserving Co.
Cambolineum Co.
Comose Wood Preserving Co.
Comose Comose Wood Preserving Co.
Comose Wood Preserving Co.
Comose Wood Preserving Co.
Comose Wood Preserving Co.
Comose Wood Preserving Co.
Comose Wood Preserving Co.
Comose Wood Preserving Co.
Comose Wood Preserving Co.
Comose Wood Preserving Co.
Comose Wood Preserving Co.
Comose Wood Preserving Co.
Comose Wood Preserving Co.
Comose Wood Preserving Co.
Comose Wood Preserving Co.
Comose Wood Preserving Co.
Comose Wood Preserving Co.
Comose Wood Preserving Co.
Comose Wood Preserving Co.
Comose Wood Preserving Co

U—see Gilbreath Chemical Co. Wolman—see American Lumber & Treating Co.

OTHER ACIDS AND CHEMICALS

Allied Chemical & Dye Corp.,
General Chemical Div.
American Cyanamid Company—
Mineral Dressing Div., Cataloged on page 123
American Potash & Chemical Corp.,
Armour Chemical Division
Atlas Powder Co.
Berk & Co., Inc., F. W., Coast
Chemical Div.
Braun Corp.
Central Scientific Co.
Dow Chemical Co., The, Cataloged on page 12
Went de Nemours & Co., E. I.,
Grasselli Chemicals Dept.
Food Machinery & Chemical Corp.,
Westvaco Chemical Div.
Mallinckrodt Chemical Div.
Mallinckrodt Chemical Works
Manu-Mine Research & Development Co.
Werck & Co.
Minerec Corp.
Monsanto Chemical Co.
Oronite Chemical Co.
O

RECORDERS

See Testing, Recording & Control Equip.

Alfrax—see Carborundum Co., The Alundum—see Norton Co. Babook & Wilcox Co. Blasscrete—see Johns-Manville Carborax—see Carborundum Co., The Carborundum Co., The, Refractories The Carborundum Co., The, Refractories Div. Cohart Refractories Co. Crystolon—eee Norton Co. DFC—see Denver Fire Clay Ca., The Denver Fire Clay Ca., The Jenerar Fire Clay Ca., The Cataloged on page 286 EMPIRE—see Green Fire Brick Co., A. P. Firecrete—see Johns-Manville General Refractories Co. Green Fire Brick Co., A. P. Ironton—see Ironton Fire Brick Co. Ironton Fire Brick Co. Co.
Ironton Fire Brick Co.
Johns-Manville
Laclede-Christy Co.
Mexico Refractories Co.
MEX-KO—see Green Fire Brick
Co., A. P.
Mex-R-Co—see Mexico Refractories Co. Monofrax—see Carborundum Co., The Mullfrax—see Carborundum The North American Refractories Co. Norton Co. Norton Co.
Plibrico Co.
Plibrico Co.
Plicast—Plibrico Co.
Quigley Co., Inc.
Utah Fire Clay Co. Allied Chemical & Dye Corp., Bar-

See Dryers and Kilns; Pyrometallurgical Equipment; Sinter-

ROCK BOLTS

See Bolts, Rock

See Grinding Equipment

See Grinding Equipment;

ROLLS, ROLLERS

See Crushers; Conveyors

ROPE, WIRE, AND ACCESSORIES

American Chain & Cable Company Inc. Bethlehem Pacific Coast Steel Corp Bethlehem Steel Co.
Bodinson Mfg. Co.
Broderick & Bascom Rope Co.
Bullard-Burnham—see Bullard Co., E. D. Canada Wire & Cable Co., Ltd., P. S. "R" Carco-see Pacific Car & Foundry

211
Climax—see Fenwick Mfg. Co.
Edwards Wire Rope
Electric Steel Foundry Co.
Fenwick Mfg. Co.
Foster Co., L. B.
Graybar Electric Co., Inc.
Hewitt-Robins, Inc.
Jones & Laughlin Steel Corp.
Jone & Laughlin Steel Corp.
225-246 Hewitt-Robins, Inc.
Jones & Laughlin Steel Corp.
Joy Mfg. Co., Cataloged on page
225-246.
Kellems Co.
Laughlin Co., The Thomas
LeTournean-Westinghouse Co.
Leschen Wire Rope—esse H. K. Perter Co., Inc., Cataloged on page
81

Silve Co., Pacific Co.
Pacific Car & Foundry Co.
Pacific Wire Rope Co.
H. K. Porter Co., Inc., Leschen
Wire Rope Div., Cataloged en
page 81
Riblet Tramway Co., Cataloged en
page 204
Roebling's Sons Corp., John A.
Round Chain Cos.
Ryerson & Son, Inc., Joseph T.
Bauerman Bros., Inc., Cataloged en
page 203

nyeron & Son, Inc., Joseph T.
Sanerman Bros., Inc., Cataloged en
page 203
Tournarope—see LeTourneau-Westinghouse Cn.
U. S. Steel Corp., Cataloged en
page 26, 265-268
U.S.B. Tiger Brand—see United
States Steel Corp., ColumbiaGeneva Steel Div.
Union Wire Rope Corp., Columbia-Geneva Steel Div., Cataloged en page 26, 265-268
United States Steel Export Ca.,
Cataloged en page 265-268
Wire Rope Corp., of America, Inc.
Wickwire—see Calerado Fuel &
Iren Corp., The

RUBBER PRODUCTS

See Belts; Hose; Conveyor Equipment: Safety Equipment

SAFETY EQUIPMENT

APPARIL

American Optical Co. Bullard Co., E. D.

Bonded Scale and Machine Co. Cal-Wie-see Colorado Fuel & Iron

Bonded Scale and Machine Co.
Cal-Wie-see Colorado Fuel & Iron
Corp., The
Cambridge Wire Cloth Co.
Colorado Fuel & Iron Corp., The,
Cataloged on page 28A, 210, 211
Conveyor Co., The
Davis Foundry & Machine Works
Deister Concentrator Co., The,
Cataloged on page 281, 282, 283
Deister Machine Co.
Diamond Iron Works Co.
Diamond Iron Works Co.
Diamond Mfr. Co.
Diamond Mfr. Co.
Cataloged Co., The
Exolon Co., The
Gruendier Crusher & Pulvertser Co.
Gundlach Machine Co., T. J.
Hendrick—see Hendrick Mfg. Co.
Hewitt-Robins, Inc.
Holmes & Bros., Inc., Robert

Hewitt-Robins, Inc.
Holmes & Bros. Inc., Robert
Hum-Mry—see Tyler Co., The W.S.,
International Combustion Ltd., Cataloged on page WM 23 (World
Mining Only)
Iowa Mfg. Co., Cataloged on page
197

197

Jeffrey Mfg. Co., The, Cataloged on page 252

Kennedy-Van Saun Mfg. & Eng. Corp., Cataloged on page 281

Laubenstein Mfg. Co.

Leaby—see Deister Concentrator Co.

Link-Belt—see Link-Belt Co. Link-Belt Co., Cataloged on page WM 76, 77 (World Mining Only)

Pioneer Engineering Works, Inc., Cataloged on page 200 Productive Equipment Corp.

Productive Equipment Corp.
Remaiy Mfg. Co.
Rogers Iron Works Co.
Ross—see Ross Screen & Feeder Co.,
Ross—see Ross Screen & Feeder Co.,
Loged on page 199
Savage Co., W. J.
Screen Equipment Co., Inc.

Smith Engineering Works
Stephan Corp., The, Cataloged on
page 205
Stephens-Adamson Mfg. Co., Cataloged on page 222
Straub Mfg. Co. Inc.
Sturtevant Mill Co., Cataloged on
page WM 81 (World Mining
Only)

Only)
Symons—see Nordberg Mfg. Co.
Syntron Co., Cataloged on page 198
Ty-Rock—see Tyler Co., The W. B.
Tyler Co., The W. S., Cataloged on
page 288
Tyler-Niagara—see Tyler Co., The
W. B.
United Iron Works Co.
Universal Engineering Corp.

Screen Equipment Co.,

Seco-see Screen Equipme Inc. Simplicity Engineering Co.

Smith Engineering Works

Co. United States Rubber Co. Victor Equipment Co. Wilkes Barre Cap Mfg. Co.

FIREFIGHTING EQUIPMENT

MREFIGHTIME EQUIPMENT
American-LaFrance-Foamite Corp.
American Rubber Mfg. Co., Inc.
Elkhart Brass Mfg. Co., Inc.
Flour Wheel Drive Auto Co., The
Fyr-Fyter Co., The
General Detroit Corp.
Grinnell Co., Inc.
Snyder & Son, Inc., M. L.
Walter Kidde & Co., Inc.

GENERAL

GENERAL

A & A Mfg. Co.
American Optical Co.
Bullard Co., E. D.
Cover, H. S.
Farris Engineering Corp.
Gibraltar Equipment & Mfg. Co.
Klein & Sons, Mathias
McDonald Co., B. F.
Michell Mfg. Co.
Miller Equipment Co., Inc.
Miller Equipment Co., Inc.
Miller Equipment Co., Inc.
Miller Equipment Co., Inc.
Miller Equipment Co.
Farker Safety Appliances

Rose Mfg. Co.
Safety Ciothing & Equipment Co.
Surder & Son, Inc., M. L.
Tolman Mfg. Co.
United States Safety Service Co.
Willson Products, Inc.

LIGHTS

AUTOMATIC WEIGHING AND BILT State BILT State BILT Industries, Inc. Bodinson Mfg. Co. Buffalo Scale Co., Inc. Chatillon & Sons, John Conveyor Co., The Denver Equipment Co., Cataloged on page 7 Bright Star Industries Ceag-see Concordia Electric Co. Champion-see Champion La Works
Champion Lamp Works
Concordia Electric Co.
Duro-Test Corp.
Edison—see Mine Safety Appliances
Ca. Denver Equipment Co., Cataloged on page 7 Fairbanks, Moree & Co., Kochring Co., Johnson Co., C. S., Merrick Scale Mfg. Co., Cataloged on page 213 Poldometer—see Schaffer Poldo-Electric Storage Battery Co., The, Exide Ind. Div. Fixide Lightguard—see Exide Ind. en page 213

Poidometer—see Behaffer Poidometer Co.
Richardson Scale Co.
Schaffer Poidometer Co.
Schaffer Poidometer Co.
Schaffer Poidometer Co.
Transportometer—see Sintering Machinery Corp.
Webb Corp., The
Weightometer—see Merrick Sesie
Mfg. Co.
TRUCK AMP. Fixide Lightguard—see Exide In Div. Fulton Mfg. Corp. General Electric Co., Lamp Div. General Equipment & Mfg. Co. Graybar Electric Co., Inc. Homelite—see Homelite Corp. Justrite Mfg. Co. Mine Service Co.

Kwik-lite—see Fulton Mfg. Corp.

Martindale Electric Co.

Mine Safety Appliances Co., Cataloged on page 95

Mosebach Electric & Supply Co. MIR. Co.

TRUCK AND RAILROAD SCALES

Bonded—see Bonded Scale and Machine Co.

Bonded Scale and Machine Co.

Bonded Scale co., Inc.

Fairbanks, Morse & Co.

Howe Scale Co., The

Hyman-Michaela Co.

Toledo Scale Co. National Mine Service Co. Revere Electric Mfg. Co. Schroeder Brothers Toledo Scale Co. Webb Corp., The Wheat—see National Mine Service Co.

SAMPLERS

Dagley Mfg. Co.
Denver Equipment Co., Cataloged
on page 7
Denver Fire Clay Co., The, Cataloged on page 286
Galigher Co., The, Cataloged on page 87 Galigher Junior-see Galigher Co.,

page WM 81 (World Only)
Telluride Iron Works Co.

SAWS, POWER

See also Tools, Air Driven

FRAMING SAWS

Only)
Wright—see Wright Power Saw &
Tool Corp.
Wright Power Saw & Tool Corp.

SCALES

Gardwell—see Safety Clothing
Equipment Co.
Goodall Rabber Co., Cataloged en
page 216, 217
Industrial Air Products Co., Cataloged on page 86
Industrial Gloves Co.
Johns-Manville
Lehigh Safety Shoe Co.
Martindale Electric Co.
Mine Bafety Appliances Co., Cataloged on page 95
Parker Safety Equipment Co.
Penn Mfg. & Supply Co.
Safety Clothing & Equipment Co.
Safety First Supply Co.
Safety Appliances Co., Cataloged on page 95
Only)
Penndrill—see Pennsylvania Drilling Co.
Sturtevant Mill Co., Cataloged on page WM 81 (World Mining Only)
Telluride Iron Works Co. American Brake Shoe Co.
Amsco-see American Brake Shoe
Co.
Columbia Steel Casting Co. Inc.
Crescent—see Sauerman Bros., Inc.
Elmec Corp., The, Cataloged en
page 297-304
Electric Steel Foundry Co.
Joy Mfg. Co., Cataloged on page
225-24
Landis Steel Co.
Manitoba Steel Foundries Ltd.
Pacific—see Alisy Steel & Metals
Co.
Sauerman Bros., Inc., Cataloged
on page 203
Vulcan Denver—see Vulcan Iren
Works, Denver, Colo.
Vulcan Iron Works (Denver), Cataloged on page 84

SCREENS, GRIZZLIES,

American Brake Shoe Co. Amsco-see American Brake Shoe

REVOLVING SCREENS

Allis-Chalmers Mfg. Co., Gen. Machy. Div., Cataloged on page 9, 289-296 American Brake Shoe Co. Amsco—see American Brake Shoe Bodinson Mfg. Co. Cal-Wic-see Colorade Fuel & Iren Only)

Only)

Lippmann Engineering Works
Manganese Steel Forge Co.
McLanshan & Stone Corp.
Mine & Smelter Supply Co., The,
Marcy Mill Div. Cataloged on
page 284, 285
Miners Foundry & Mfg. Co.,
Nordberg Mfg. Co., Cataloged on
page 12
Pioneer Engineering

CHAIN SAWS
Graybar Electric Co., Inc.
Homelite—see Homelite Corp.
Homelite Corp.
Mill & Mine Supply, Inc.
Porto-Cut—see Vulcan Iron Works,
Denver, Colo.
Vulcan Iron Works (Denver), Cataloged on page 84
Wright Power Saw and Tool Corp. DeWalt Inc.
Stearns Roger Mfg. Co., Cataloged
on page 214 on page 214

POWERED HAND SAWS

Black & Decker Mfg. Co., The
Chicago Pneumatic Tool Co.
Graybar Electric Co., Inc.
Peerless Machine Co.
Syntron Co., Cataloged on page 198
Thor—see Thor Power Tool Co.
Thor Power Tool Co., Cataloged on
page WM 22 (World Mining
Only)

Kennedy-Van Saun Mfg. & Eng. Corp., Cataloged on page 201 Laubenstein Mfg. Co. Link-Belt—see Link-Belt Co. Link-Belt Co., Cataloged on page WM 76., 77 (World Mining Only)

Lippmann Engineering Works Manganese Steel Forge Co. McLanahan & Stone Corp.

page 13
Pioneer Engineering Works, Inc.,
Cataloged on page 200
Reliance—see Universal Road Machinery Co.

Washington Machinery Co. Webb Corp., The Wedge Wire Corp.

SHAKING AND VIBRATING SCREENS

Ajax Flexible Coupling Co.
Allis-Chalmers Mfg. Co., Gen. Machy Div., Cataloged on page 9,
289-294 Barber-Greene Co., Cataloged on page 78 Bodinson Mfg. Co.

Bonded—see Bonded Scale and Ma-chine Co.

AND ACCESSORIES

Bodinson Mfg. Co.
Cal-Wie-see Celerade Fuel & Iren
Corp., The
Corp., The
Colorado Fuel & Iron Corp., The,
Cataloged on page 28A, 210,
211
Columbia Steel Casting Co. Inc.
Conveyor Co., The
Davis Foundry & Machine Works
Diamond Iron Works Co.
Diamond Mfg. Co.
Gruendler Crusher & Pulveriser Co.
Gundiach Machine Co., T. J.
Hendrick—see Hendrick Mfg. Co.
Iewa Mfg. Co., Cataloged on page
197

Miners Foundry & Mfg. Co. Nordberg Mfg. Co., Cataloged en page 13

chinery Go.
Remaly Mfg. Co.
Rogers Iron Works Co.
Smith Engineering Works
Stearns Roger Mfg. Co., Cataloged
on page 214

on page 214
Stephan Corp., The, Cataloged on
page 205
Stephens-Adamson Mfg. Co., Cataloged en page 202
Straub Mfg. Co., Inc.
Symons-see Nordberg Mfg. Co.
Taylor-Wharton Iron & Steel Co.
Universal Engineering Corp.
Universal Road Machinery Co.
Wachburgen, Machinery Co. Yuba Mfg. Co., Cataloged on page

Manufacturer's Complete Names and Addresses are listed in Section II, last pages of this yellow section.

Wilmot Engineering Co. Yuba Mfg. Co., Cataloged on page 79 STATIONARY SCREENS AND GRIZZLIES

Universal Engineering Corp.
Universal Vibrating Screen Co.
Webb Corp., The
Webster Mfg., Inc.
Wedge Wire Corp., Cataloged on
page 268
Wilmot Engineering Co.

GRIZZLIES

American Brake Shoe Co., American Brake Shoe Co., American Brake Shoe Co., American Manganese Steel Div.

Amsco—see American Brake Shoe Co., Bonded—see Bonded Scale and Machine Co.

Bonded Scale and Machine Co.

Cal-Wic—see Colorado Fuel & Iron
Corp., The
Calorado Fuel & Iron Corp., The,
Cataloged on page 28A, 218,
211

Columbia Steel Casting Co. Inc.

211 Columbia Steel Casting Co. Inc. Conveyor Co., The Davis Foundry & Machine Works Diamond Iron Works Co. Diamond Mfg. Co.

SCRAPERS

See also Excavators; Tractors

and Attachments
Alloy Steel & Metals Co., Cataloged
on page 6

Gruendler Crusher & Pulveriser Co. Gundlach Machine Co., T. J. Hendrick-ace Hendrick Mfg. Co. Hendrick Mfg. Co. Hewitt-Robins, Inc. Iowa Mfg. Co., Cataloged on page Jeffrey Mfg. Co., The, Cataloged on page 252
Kennedy-Van Baun Mfg. & Eng. Corp., Cataloged on page 201
Laubenstein Mfg. Co.
Link-Belt-eee Link-Belt Co.
Link-Belt Co., Cataloged on page WM 76, 77 (World Mining Only) WM 76, 77 (World Mining Only)
Lippmann Engineering Works
Manganese Steel Forge Co.
Manganese Steel Forge Co.
Minis Engineering Works
Seathwestern Engineering Co., Cataloged on page 287
Stephens-Adamson Mfg. Co., Cataloged on page 282
Straub Mfg. Co., Inc.
Sweco—see Southwestern Engineering Co.
Syntres Co., Cataloged on page 198
Taylor-Wharton Iron & Steel Co., Cataloged on page 249-276
Traylor Engineering & Mfg. Co., Cataloged on page 288
Universal Engineering Corp., Washington Machinery Co.
Webb Corp., The
Wedge Wire Corp., Cataloged on page 288
Yuha Mfg. Co., Cataloged on page 298
Yuha Mfg. Co., Cataloged on page 79

WIRE AND BAR SCREENS

Allie-Chalmers Mfg. Co., Gen. Ma-chy. Div., Cataloged on page 9, 289-296 erican Brake Shoe Co. Amsco-eee American Brake Bhoe
Bixby-Zimmer Engineering Co.
Cal-Wic-eee Colorado Fael & Iron
Corp., The
Chain Bett Co.
Cleveland Wire Cloth & Mfg. Co.
Colorado Fael & Iron Corp., The,
Cataloged on page 35A, 216, 211
Gundlach Machine Co., T. J.
Hendrick Mfg. Co.
Hewitt-Robins, Inc., Korb-Fettit
Wire Fabrics & Iron Works,
Inc., a subald.
Iowa Mfg. Ce., Cataloged on page Inc., a subside.

Iowa Mfg. Ce., Cataloged on page
197

Jeffrey Mfg. Ce., The, Cataloged on
page 252

Lippmann Engineering Works
Ludlow-Saylor Wire Cloth Co.
Manganese Steel Forge Co.
Newark Wire Cloth Co.
Remaily Mfg. Co.
Simplicity Engineering Co.
Simplicity Engineering Works
STARSTEEL—see Star Wire Screen
& Iron Works, Inc.
Star Wire Bereen & Iron Works,
Inc. Star Wire Bereen & Iron Works, Inc.

SUPER-LOY—see Ludlow-Saylor Wire Cloth Co.
Tyler Co., The W. S., Cataloged on page 288
Wedge Bar Screen Corp.
Wedge Slot—see Hendrick Mfg. Co.
Wedge Wire Corp., Cataloged on page 208

SPRAY NOZZLES

Delater Concentrator Co., Cataloged on page 281, 282, 283
Delater Machine Co. Grinnel Co., Inc. Gundlach Machine Co., T. J. Hydraulic Supply Mfg. Co. Iowa Mfg. Co., Cataloged on page 197
Link-Belt Co., Cataloged on page WM 76, 77 (World Mining Only)
Rex—eee Chain Belt Co. Spray Engineering Co. Yaba Mfg. Co., Cataloged on page Tg

SCRUBBERS

EXHAUST, DIESEL

Eimeo Corp., The, Cataloged on page 297-304

Landis Steel Co. Ruth Co., The

SAND

Alia-Chaimers Mfg. Co., Gen. Machy. Div., Cataloged on page 5, 189-296
Bodinson Mfg. Co.
Conveyor Co., The
Diamond Iron Works Co.
Eimeo Corp., The, Cataloged on
page 297-394
Gruendier Crusher & Pulverizer Co.
Hardinge Co., Inc., Cataloged on
page 97, 103
Link-Belt—see Link-Belt Co.
Link-Belt Co., Cataloged on page
WM 76, 77 (World Mining
Only) WM Only) Only)
opmann Engineering Works
oneer Engineering Works, Inc.,
Cataloged on page 200
liance—see Universal Road Ma-Cataloged on page 200
Reliance—see Universal Road Machinery Co.
Rogers Iron Works Co.
Ruth Co., The
Smith Engineering Works
Straub Mfg. Co., Inc.
Universal Dredge & Mfg. Co., Cataloged on page 86
Universal Engineering Corp.
Universal Road Machinery Co.
Western Machinery Co., Cataloged on page Inside Back Cover

SEPARATORS

See also Magnetic Equipment; Classifiers; Concentrators

AIR

CE-Raymond—see Combustion Engineering, Inc.
Combuston Engineering, Inc.
DriAir—see New Jersey Meter Co.
Hardinge Co., Inc., Cataloged on
page 97, 103
Hennedy-Van Saum Mfg. & Eng.
Corp., Cataloged on page 201
Kirk & Blum Mfg. Co., The
New Jersey Meter Co.,
Reliance-Gayco—see Universal Road
Machinery Co.
Sutton, Steele & Steele, Inc.
Universal Road Machinery Co.

ELECTROSTATIC

Engineers Syndicate, Ltd., Cataloged on page 76
Sutton, Steele & Steele, Inc.
Westinghouse Electric International
Co., Cataloged on page 261-264

SETS, CIRCULAR STEEL

See Steel

SHAFT SINKING

CONTRACTORS

Johnson Co., The R. G. Longyear Co., E. J. Minerals Engineering Co.

SHAKERS, CAR

Allis-Chalmers Mfg. Co., Gen Machy. Div., Cataloged en page 9, 289-296
Hewitt-Robins, Inc.
Link-Belt Co., Cataloged en page WM 76, 77 (World Mining Only)
Link-Belt—see Link-Belt Co., R & M—see Robbins & Myers, Inc.
Robbins & Myers, Inc.
Stephens-Adamson Mfg. Co., Cataloged on page 202

SHARPENERS, ROCK BIT AND STEEL

Simonds Worden White Co. Stardrill-Keystone Co.

SHEAVES

See Blocks and Sheaves

SHOVELS, POWER

See Excavators

SINKERS

See Drills, Rocks

SINTERING MACHINES

See also Pyrometallurgical Equipment
Allis-Chaimers Mfg. Co., Gen. Machy Div., Cataloged on page
5, 259-296
American Brake Shoe Co.
Amaco—see American Brake Shoe

American Brake Shoe Co.
Amsco—see American Brake Shoe
Co.
Dwight-Lloyd—see Sintering Machinery Corp.
Electric Steel Foundry Co.
Hevi-Duty Electric Co.
Kennedy-Van Saun Mfg. & Eng.
Corp., Cataloged en page 201
Mace—see Mace Co., The
Mace Co., The., Cataloged en page
National Malicable & Steel Co.

105 Malleable & Steel Castings Co., Cataloged on page 1 Pollock Co., The William B. Sintering Machinery Corp., Smidth & Co., F. L., Cataloged on page 28B Webb Corp., The Yuba Mfg. Co., Cataloged on page 78

SKIPS

See Hoisting Equipment

SLACKLINES

See Excavators

SLINGS

See Rope, Wire

SLUSHERS

See Excavators; Hoisting Equipment; Scrapers

SPEED CHANGERS, INCREASERS AND/OR REDUCERS

Abart Gear & Machine Co.
American Pulley Co., The
Bodinson Mfg. Co.
Boston Gear Works
Christian Engineers, J. D.
Cleveland Worm & Gear Co., The
Continental Gin Co., Ind. Div.
Conveyor Co., The
Dodge Manufacturing Corp.
Falk Cerp., The, Cataloged on page
1371-288
Farrel—see Farrel-Birmingham Co.,
Inc. Farrel—see Farrel-Birmingham Co., Inc.
Farrel-Birmingham Co., Inc.
Foote Bros. Gear & Machine Corp.
Hygrade—see Foote Bros. Gear &
Machine Corp.
Iewa Mfg. Co., Cataloged on page Baldor Electric Co.
Blount Co., J. G.
Copec Pacific, Ltd., Cataloged page 53
Gardner-Denver Co., Cataloged on page 16
Ingersoll-Rand Co., Cataloged on page 250, 251

137
Jones Foundry & Machine Co., W.A.
Line-O-Power—see Foote Gera & Machine Corp.
Corp.
Gera & Machine Corp.
Link-Belt Co., Cataloged on page WM 76, 77 (World Mining Only)
Low-joy Flexible Coupling Co.
Manitoba Steel Foundries Ltd.

Maxi-Power—see Foote Bros. Gear & Machine Corp.
Metron Instrument Co.
Penmer-Bee Co.
Perkins Machine & Gear Co.
Philadelphia Gear Works, Inc.
Bite-Lo-Speed—see Christian Ragineers, J.D.
Shaft-King—see American Pulley
Co., The
Stephens-Adamson Mfg. Co., Cataloged on page 202
Syncrogear—see U.S. Electrical Motors, Inc.
U.S. Electrical Motors, Inc.
Webb Corp., The
Western Gear Works
Pacific Genr Plant
Westinghouse Electric International Western Gear Works
Pacific Gear Plant
Westinghouse Electric International
Co., Cataloged on page 361-364
Worthington Corp.

SPIRALS

See Concentrators

SPOTTERS, CAR

Advance Car Mover Co., Inc.
Aldon—see The Aldon Company
Aldon Company, The
American Hoist & Derrick Co.
Badger Line—see Advance Car
Mover Co., Inc.
Bodinson Mfg. Co.
Brown-Fayro Co., The
Christian—see Christian Engineers,
J.D. J.D.
Christian Engineers, J.D.
Flood City—see Flood City Brass &
Electric Co.
Flood City Brass & Electric Co.
Jeffrey Mfg. Co., The, Cataloged en
page 252
Jones Foundry & Machine Co., W.A.
Jey Mfg. Co., Cataloged on page
225-246
Link Belt Co. 275-246
Link-Belt—see Link-Belt Ce.
Link-Belt Co., Cataloged on page
WM 76, 77 (World Mining
Only)
Nolan Co., The
Nolan Porta-Feeder—see Nelan Co.,
The
Superior-Lidgerwood-Mundy Corp.
Vulcan Iron Works (Pa.)

STEEL

See also Bits

ALLOY STEEL

Allegheny Ludium Steel Corp.
Allegheny Metal—see Allegheny
Ludium Steel Corp.
Allied Steel & Tractor Products,

American Brake Shoe Co. American Brake Shoe Co. American Manganese Steel Div. Amsco—see American Brake Shoe

American Manganese Steel Div.
Amsco-ese American Brake Shoe
Bethlehem Pacific Coast Steel Corp.
Bethlehem Steel Co.
Copeo Facific, Ltd., Cataloged en
page 53
Electric Steel Foundry Co.
Gardner-Denver Co., Cataloged on
page 16
Jones & Laughlin Steel Corp.
Manganal—see Stulz-Sickles Co.
Manitoba Steel Foundries Ltd.
Republic—see Republic Steel Corp.
Republic Steel Corp.
Ryerson & Son. Inc., Joseph T.
Sheffield Steel Corp.
Crucible Steel Corp.
Crucible Steel Co. of America
Helmick Foundry-Machine Co.
Lukens Steel Co.
Cutaloged on page 215
United States Steel Export Co.,
Cataloged on page 215
United States Steel Export Co.,
Cataloged on page 245-268
USS—see U.S. Steel Corp.
U.S. Steel Corp., Cataloged on page
26, 265-268
Webb Corp., The

DRILL STEEL

Allison Steel Mfg. Co., Cataloged on page 118 Bethlehem Pacific Coast Steel Corp. Bethlehem Steel Co.

Brunner & Lay Companies
Coeur d'Alene Hardware & Foundry
Co.
Copce Pacific, Ltd., Cataloged on
page 53*
Gardner-Denver Co., Cataloged on
page 26, 251
Jones & Laughlin Steel Corp.
Joy Mfg. Co., Cataloged on page
225-240
Minerals Engineering Co.
Pennaylvania Drilling Co.
Republic—see Republic Steel Corp.
Republic Steel Corp.
Crucible Steel Co. of America
Ryerson & Son, Inc., Joseph T.
Sheffield Steel Corp.

SETS--CIRCULAR STEEL

Commercial Shearing & Stamping

STRUCTURAL STEEL

STRUCTURAL STEEL

Bethlehern Pacific Coast Steel Corp.
Bethlehern Steel Co.
Bodinson Mfs. Co.
C F & I—see Colorado Fuel & Iren
Colorado Fuel & Iren Corp., The
Colorado Fuel & Iren Corp., The,
Cataloged on page 28A, 218, 211
Dobois Foundry & Machine Co.
Jones & Laughin Steel Corp.
Pacific Car & Foundry Co.
Refined Son, Inc., Joseph T.
Sheffield Corp.
Lis. Steel Corp.
Lis. Steel Corp.
Columbia-Geneva Bieel Div.,
Cataloged on page 28, 285-268
United States Steel Expert Co.,
Cataloged on page 285-268
United States Steel Steel Div.,
Cataloged on page 285-268
United States Steel Steel Fixpert Co.,
Cataloged on page 285-288
United States Steel Steel Corp.,
Columbia-Geneva Steel
Corp., Columbia-Geneva Steel
Div.
Web Corp., The Webb Corp., The Yuba Mfg. Co., Cataloged on page 79

STOPERS

See Drills, Rock

SURVEYING **INSTRUMENTS &** EQUIPMENT

See also Engineering and Drafting Equipment; Exploration Equipment

Adinsworth & Sons, Inc., Wm.
Berger & Sons, Inc., C.L.
Brunson Instrument Co.
Brunson Pecket Transit—see Wm.
Alinsworth & Sons, Inc.
Buff & Buff Mfg. Co.
Engineers Syndicate, Ltd., Cataloged on page 76
Gurley, W. & L.E.
Keuffel & Easer Co.
Longyear Co., E.J.
Lufkin Rule Co.
Nucleonic Company of America
Precision Radiation Instruments,
Inc.
Rocky Mountain Instrument Co.
Warren-Knight—see Warren-Knight
Co. Roe. Warre. Co. Warren-Knight Co. White Co., David

SWITCHES, RAIL

See Track and Accessories

TABLES

See Concentrators

TANKS

See Thickeners and Tanks; Agitators and Conditioners

See Communications

TESTING, RECORDING EQUIPMENT

See also Gauges; Scales

MILL CONTROL

Allis-Chaimers Mfg. Co., Gen. Machy. Div., Cataloged on page 9, 289-296 9, 285-294

Beckman Instruments, Inc.
Bristol Co., The
Clark Controller Co., The
Davis Co., Nelson L.
Fisher & Porter Co.
Heyl & Patterson, Inc.
Inet Division of Leach Corp.
Lake Shore Electric Corp.
O-Z—see Zernickow Co., O.
Schroeder Brothers
Zernickow Co., O.

PYROMETALLURGICAL CONTROL

Allis-Chalmers Mfg. Co., Gen.
Machy. Div., Cataloged on page
9, 289-296
Assembly Products, Inc.
Barber-Colman Co.—Sheeleo Instrument Div.
Bristol Co., The
Foxboro Co., The
Leeds & Northrop Co.
Weston Electrical Instrument Corp.

RECORDERS

Bristol Co., The Johnson, J.M. & O.R.

THICKENERS AND TANKS

See also Cyclones

STEEL TANKS

Beall Pipe & Tank Corp.
Bethlehem Steel Co.
Black, Sivalla & Bryson, Inc.
Butler Mfg. Co.
Caldwell Co., W.E. Butler Mfg. Co.
Caldwell Co., W.E.
Chicago Bridge & Iron Co.
Columbian Steel Tank Co., Cataloged on page 66
Dagley Mfg. Co.
Davis Foundry & Machine Works
Denver Equipment Co., Cataloged
on page 7
Dresser-Stacey Co., Stacey Bros.
Div.

on page 7
Dreaser-Stacey Co., Stacey Bros.
Div.
General American Transportation
Corp.
Graver Tank & Mfg. Co., Inc.
Gramm Trailer Corp.
Grage Go., Ltd. The, Cataloged en
page WM 20, 21 (World Mining
Only)
Hapman-Dutton Co., Hapman Conveyors, Inc.
Hrisch Bros. Machinery Co.
Hydraulic Supply Mfg. Co.
Kelley & Co., O.G.
Kennedy-Van Saun
Corp., Cataloged on page 201
Kirk & Blum Mfg. Co., The
Landis Steel Co.
Merrill Co.
Merrill Co.
Miners Foundry & Mfg. Co.
Neal Machinery Co., H.T.
Ogden Iron Works Co.
Process Engineering Inc.
Southwestern Engineering Co.,
Cataloged on page 287
Webb Corp., The
Wemco—see Western Machinery Co.

Western Machinery Co., Cataloged on page Inside Back Cover Wilmot Engineering Co.

THICKENERS

HICKENIES

Bird—see Bird Machine Co.
Bird Machine Co.
Bird Machine Co.
Butler Mfg. Co.
Caldwell Co., W.E.
Chicago Bridge & Iron Co.
Columbian Steel Tank Co., Cataloged on page 65
Dagley Mfg. Co.
Denver Equipment Co., Cataloged on page 7
Dorr Co., The, Cataloged on page 12
Graver Tank & Mfg. Co., Inc.
Hardinge Co., Inc., Cataloged on page 97, 103
Heyl & Patterson, Inc.
Hirsch Bros. Machy. Co.
Kelley & Co., O.G.
Kennedy-Van Saun Mfg. & Eng.
Corp., Cataloged on page 291
Link-Belt Co., Cataloged on page WM 78, 77 (World Mining Only)
Miners Foundry & Mfg. Co.
Morse Bros. Machinery Co.
Neal Machinery Co., H.T.
Webb Corp., The
Wemco—see Western Machinery Co.
Western Machinery Co., Cataloged on page landed Back Cover Bird-see Bird Machine Co. Bird Machine Co.

WOOD TANKS

Acme Tank Mfg. Co. Arrow—see Arrow Tank Company Acme Tank Mg. Co.
Arrow—see Arrow Tank Company
Inc.
Arrow—see Arrow Tank Company
Inc.
Atlantic Tank Corporation
Black, Sivalls & Bryson, Inc.
Brooks—see Brooks Lumber Co.
Brooks Lumber Co.
Caldwell Co., W.E.
Dazley Manufacturing Co.
Pederal Pipe & Tank Co., Cataloged
on page 118
Halls & Sons, Amos H.
Hauser-Stander Tank Co., The
Kelley & Co., O.G.
Morse Bros. Machinery Co.
National Tank & Pipe Co.
National Tank & Pipe Co.
Neal Machinery Co., H.T.
Pacific Wood Tank Corp., Cataloged
on page 195
Santa Fe Tank & Tower Co.
Wemco—see Western Machinery Co.
Western Machinery Co., Cataloged
on page Inside Back Cover
Windeler Co., Ltd., George

TIES, TRACK

See Track and Accessories

TIRES AND TUBES, **OFF-HIGHWAY**

Firestone Tire & Rubber Co., The Goodrich Co., B.F. Goodyear Tire & Rubber Co. United States Rubber Co.

TOOLS, AIR DRIVEN-

PORTABLE

See also Drills, Rock Chicago Pneumatic Tool Co. Copco Pacific, Ltd., Cataloged on page 53 Gardner-Denver Co., Cataloged on page 16 Ingersoll Rand Co., Cataloged on Ingereoll Rand Co., Cataloged en page 259, 251 Jey Mfg. Co., Cataloged on page 225-246 Le Roi Co., Cataloged on page 248, 249 Worthington Corp. Wright—see Wright Power Saw & Tool Corp. Wright Power Saw & Tool Corp.

TORQUE CONVERTERS

See Transmissions

TRACK & ACCESSORIES

RAIL AND TIES, STEEL

RAIL AND TIES, STEEL
Allison Steel Mfg. Co., Cataloged
on page 118
Bethlehem Pacific Coast Steel Corp.
Bethlehem Steel Co.
C F & I.—see Colorado Fuel & Iron
Corp., The
Central Frog & Switch Co., The
Cataloged on page 28A, 216, 211
Foster Co., L.B.
Gemeo Tru-Blu—see Gibraltar
Equipment & Mfg. Co.
Gibraltar Equipment & Mfg. Co.
Gibraltar Equipment & Mfg. Co.
Gregs Co., Ltd., The, Cataloged en
page WM 26, 21 (World Mining
Only)
Hyman-Michaels Co.
Manitoba Steel Foundries Ltd.

Manitoba Steel Foundries Ltd.

Morse Bros. Machinery Co.,

Pressed Steel Car Co., Inc., Cataloge on page WM 90 (World Mining Only)

Mining Only)
United States Steel Corp., Cataloged
on page 26, 265-268
United States Steel Export Co.,
Cataloged on page 265-268
USS—see U.S. Steel Corp.

SWITCHES, FROGS, CROSSINGS, ETC.

Aldon—see The Aldon Company Aldon Company, The American Brake Shoe Co. American Brake Shoe Co., Ramapo Ajax Div.

American Mine Door Company, Cataloged on page 212 Amaco—see American Brake Shoe Co.

Atlas Car & Mfg. Co., The, Cata-loged on page 245 Bethlehem Pacific Coast Steel Corp. Bethlehem Pacific Coast Steel Corp.
Bethlehem Steel Co.
Card Iron Works Co., The C.S.,
Cataloged on page 246, 247
Central Frog & Switch Co., The
Coover Railroad Track Brace Co.,
The
Eimco Corp., The, Cataloged en
page 297-304
Gibraltar Equipment & Mfg. Co.

page 297-304
Gibraltar Equipment & Mfg. Co.
Gibraltar Equipment & Mfg. Co.
Gregg Co., Ltd., The, Cataloged en
page WM 20, 21 (World Mining
Only)
Havon Track Applicant Co.

Only)
Hayes Track Appliance Co.
Helmick Foundry-Machine Co.
Hyman-Michaela Co.
Jim Crow—see the Aldon Company
Manitoba Steel Foundries Ltd. Morse Bros. Machinery Co. Mosebach Electric & Supply Co. Monebach Electric & Supply Co.
Nolan Co., The
Penn Machine Co.
Pressed Steel Car Co., Inc., Cataloged on page WM 90 (World
Mining Only)

Mining Unity)
Samson—The Aldon Co.
Taylor-Wharton Iron & Steel Co.
United States Steel Export Co.,
Cataloged on page 265-268
USS—see U.S. Steel Corp.
U.S. Steel Corp., Cataloged on page
26, 265-268 Weir Kilby Corp.

TRACTORS & ATTACHMENTS

TRACTORS

Agricat—see Pence & Co., Inc., Earl H. Allis-Chalmers Manufacturing Co., Tractor Div., Cataloged on page 14, 15 American Tractor Equipment Corp.

Manufacturer's Complete Names and Addresses are listed in Section II, last pages of this yellow section.

Autocar—see The White Motor Co.,
Autocar Div.
Caterpiliar Tractor Co.
Elmee Corp., The, Cataloged on page 27-304
FWD—see Four Wheel Drive Auto Co., The Four Wheel Drive Auto Co., The Hough Co., The Frank G.
Hyrean-Michaels Co.
Harractional — see International Harvester Export Co., Cataloged on page 25-265
International Harvester Co., Cataloged on page 26-268
International Harvester Export Co., Cataloged on page 27-28-28
International Harvester Export Co., Cataloged on page 9M 91
(Warid Mining Only)
LaTournean-Westingbouse Co.
Mack Tracks, Inc., Cataloged on page 9M 20, 21
International Harvester Export Co., Cataloged on page 32, 23
Inneceptional Harvester Export Co., Cataloged on page 9M 20, 21 (World Mining Only)
LaTournean-Westingbouse Co.
Tractomotive Corp.
White Motor Co., The, Autocar Div.

ATTACHMENTS

ATTACHMENTS Allied Steel & Tractor Products,

Inc.
Allis-Chalmers Manufacturing Co.,
Tractor Division, Cataloged on
page 14, 15
Alloy Steel & Metals Co., Cataloged
on page 6
American Hrake Shoe Co.
American Tractor Equipment Corp.
Amso—soe American Brake Shoe
Co. American Brake Shoe Co.
American Tractor Equipment Corp.
American Tractor Equipment Corp.
American Tractor Equipment Corp.
Baker Manufacturing Co., The
Balderson Inc.
Bucyrus-Erie — see International
Harvester Export Co.
Caro—see Pacific Car & Foundry
Co.
Caterpillar Tractor Co.
Continental Mfg. Corp.
Orating Carroll Co.
Drott—see Drott Mfg. Corp.
Drott—see Drott Mfg. Corp.
Drott Mfg. Corp.
Bimeo Corp., The, Cataloged en
page 297-364
Electric Steel Foundry Co.
Fruchauf—see Fruchauf Trailer Co.
Gar Wood Industries Inc.
Heil Co., The
Hough—see International Harvester
Export Co.
Hough Co., The Prank G.
International Harvester Export Ca.,
Cataloged en page 91
International Harvester Export Co.,
Cataloged en page WM 91
(World Mining Only)
Manitoba Steel Foundries Ltd.
Oliver Corp., The
Pacific Car & Foundry Co.
Pence & Co., Inc., Earl H.
Pullman—see International Harvester
ter Export Co.
Sitd-Shovel—see Drott Manufacturtng Corp.
Vise-Grip—see Continental Mfg. Co.
Tractomotive Coars.

TRAILERS

See Trucks and Trailers

TRAMMERS

See Lecematives

TRAMWAYS, AERIAL

Skid-Shovel—see Drott Manuractur-ing Corp. Vise-Grip—see Continental Mfg. Co. Tractomotive Corp. Webb Corp., The Wooldridge Manufacturing Co.

BUCKETS

American Brake Bloe Co.
American Manganese Steel Div.
Bodinson Mfg. Co.
Columbia-Geneva—see United States
Steel Corp., Columbia-Geneva
Steel Div.
Gragg Co., Ltd., The, Cataloged on
page WM 30, 21 (World Mining
Morse Bros. Machinery Co.
Neal Machinery Co., R.T.
Riblet Tramway Co., Cataloged en
page 204
Banford-Day Iron Works Inc.
Telluride Iron Works Co.

Moree Bros., Machinery Co., Riblet Tramway Co., Cataloged on page 264
Sauerman Bros., Int., Cataloged on page 283
United States Steel Corp., Columbia-Geneva Steel Div., Cataloged on page 26, 265-365
United States Steel Export Ca., Cataloged on page 26-268
Washington Iron Works
Yara Engineering Corp.
Interstate Equipment Div.

TOWERS

Bodinson Mfg. Co.
Columbia Geneva—see United States
Steel Corp., Columbia-Geneva
Steel Div.
Gregg Co., Ltd., The, Cataloged on
page WM 20, 21 (World Mining Gresg Co., Ltd., The, Cataloged on page VM 29, 21 (World Mining Only)

Riblet Tramway Co., Cataloged on page 204
Saserman Bres., Inc., Cataloged on page 283
United States Steel Corp., Columbia-Geneva Steel Div., Cataloged on page 26, 263-365
United States Steel Export Co., Yara Engineering Corp., Interstate Equipment Div., Washington Iron Works

TRANSFERS, CAR

American Mine Door Company, Cataloged on page 212 Canton—see American Mine Door Cataloged on page 212
Canton—see American Mine Door
Company
Card Iron Works Co., The C.S.,
Cataloged on page 248, 247
Eimco Corp., The, Cataloged on
page 297-394
Gregg Co., Ltd., The, Cataloged on
page WM 20, 21 (World Mining
Only)
Buterprise Wheel & Car Corp.
Iron to Engine Co., The
Irwin Foundry & Mine Car Co.
Sanford-Day Iron Works Ine.
United States Steel Export Co.
Webb Corp., The

TRANSITS

See Surveying Instruments &

TRANSMISSIONS AND TORQUE CONVERTERS

Berry—see Oliver-Iron & Steel
Corp.
Fuller Mg. Co.
General Motors Oversees Corp.,
Cataloged on page WM 19
(World Mining Only)
Jones Foundry & Machine Co., W.A.
Koppers Co., Fast's Coupling Dept.
Link-Belt—see Link-Belt Ca.
Link-Belt—see Link-Belt Ca.
Link-Belt—see National Supply Co.,
The
Only)
National—see National Supply Co.,
The
Oligear Co., The
Oligear Co., The
Oliver Iron & Steel Corp.
Reeves Pulley Co.
Schneider—see Schneider Mfg. Corp.
Schneider—see Schneider Mfg. Corp.

TRIPPERS

See Conveyor Equipment

TROLLEY EQUIPMENT

See also Locomotives See also Locemetives
Duquesne Mine Bupply Co.
Elreco Corp., The
Flood-City—see Flood City Brass &
Electric Co.
Flood City Brass & Electric Co.
Ironton Engine Co., The
Les-Norse Co.
Mosebach Electric & Supply Co.
Ohio Brass Co.
Reading—see Reading Crane &
Hoist
Reading Crane & Hoist
Westinghouse Electric International
Co., Cataloged on page 361-284
Whiting Corp.

TROMMELS

See Screens, Grizzlies, and

ON HIGHWAY

Autocar—see White Motor Co., Tha.,
Autocar Div.
Beall Pipe & Tank Corp.
Black Diamond—see Enterprise
Wheel & Car Corp.
Chrysler Corp., Dodge Div.
Dart Truck Co.
Dorsey Trailers
Enterprise Wheel & Car Corp.
Enterprise Wheel & Car Corp.
Enterprise Wheel & Car Corp.
Cataleged on page 241-244
F.A.B. Manufacturing Co.
FWD—Four Wheel Drive Auto Co.,
The FWD—Four Wheel Drive Auto Co.,
The
Pabeo—see F.A.B. Manufacturing
Co.
Four Wheel Drive Auto Co., The
Fruehauf—see Fruehauf Trailer Co.
Fruehauf Trailer Co.
Galion Alisteel Body Co.
Galion Alisteel Body Co.
Galion Misteel Body Co.
Galion Alisteel Body Co.
Galion Alisteel Body Co.
Galion Misteel Corp.
Galion Trailer Corp.
Hockensmith Corp., The
International — see International
Harvester Export Co.,
Cataloged on page WM 91
(World Mining Only)
Klockner-Humboldt-Deuts Ag
Koehring Co.
LaOrosse Trailer Corp.
Landis Steel Co.
Mack Trucks Inc., Cataloged en
page 22, 31
Penn Body—see Hockensmith Corp.,
The
Sterling Motors Corp.
White Motor Co., The
Yale and Towne Mfg. Co.—Materlals Handling Div.

OFF-HiGHWAY -see F.A.B. Manufacturing

OFF-HIGHWAY

OFF-HIGHWAY

Athey Products Corporation

Autocar—see The White Motor Co.,

Autocar Div.

Beall Pipe & Tank Corp.

Dart Truck Co.

Dorsey Trailers

Easton—see Easton Car & Coastruction Co.

Easton Car & Construction Co.

Easton Car & Construction Co.

Eactin Car & Construction Co.

[World Mining Section-324]

Smith Power Transmission Co., The
Twin Disc Clutch Co.
U. S. Electrical Motors, Inc.
U. S. Electrical Motors, Inc.
Western Gear Works
Western Gear Works
Western Gear Works, Pacific Gear
Flant
Flant
Flant
Flant
Flant
Flant
George
Geor FWD—Four Wheel Drive Auto Co.,
The
The
Factor—see F.A.B. Mfg. Co.
Four Wheel Drive Auto Co., The
Fruchauf—see Fruchauf Trailer Co.
Gallon Alisteel Body Co.
Gallon Alisteel Body Co.
Gate City Steel
General Motors Cerp., Eaclid Division, Cataloged on page 241-244
Getman Bruthers
Gramm Trailer Corp.
Hocksensmith Corp., The
Hyman-Michaels Co.
International — see International
Harvester Expert Co.
International Harvester Co., Cataloged on page 91
International Harvester Co., Cataloged on page 91
International Harvester Expert Ce.
Cataloged on page WM 91
(Warld Mining Only)
LaCrosse Trailer Corp.
Landis Steel Co.
LaTourneau-Westinghouse Co.
Mack Trucks Inc., Cataloged en
page 22, 23
Penn Body—see Hockensmith Corp.,
The
Rogers Brothers Corp.
Terrs Coths—see Wooldridge Mfg.
Co.
Tournarocker — see LeTourneauWestinghouse Co.
Tournarocker — see LeTourneauWestinghouse Co.
Tournarocker — see LeTourneauWestinghouse Co.
Tournarocker — see LeTourneauWestinghouse Co.
Tournarocker — See LeTourneauWestinghouse Co., The
White Motor Co., The, Autoear Div.
Winter Weiss Co., The
Wooldridge Mfg. Co.

TRUCK BODIES

Galion Alisteel Body Co. Garwood Industries Inc. Hockensmith Corp., The

TUNGSTEN CARBIDE

PRODUCTS

Allegheny Ludlum Steel Corp.
American Brake Shoe Co.
Amsco-see American Brake Shoe
Co. Co.
Brunner & Lay Companies
Carboloy—see General Electric Co.
Carmet — see Allegheny Ludium
Steel Corp.
Copco Pacific, Ltd., Cataloged on Copco Pacific, Ltd., Cataloged on page 53
Firth Sterling Inc.
Firthite—see Firth Sterling Inc.
Gemoo Tru-Blu — see Gibraltar
Equipment & Mfg. Co.
General Electric Company—Carboloy Dept.
Gibraltar Equipment & Mfg. Co.
International General Electric Co.,
Cataloged on page Inside Front
Cover (World Mining Only)
Joy Mfg. Co., Cataloged on page
225-246
Kennametal Inc.
Longyear Co., E. J.
Rok-Bits—see Brunner & Lay Companies Rok-Bits—see Brunner & Lay Com-panies Stoody Co.
Sulmet—see Joy Mfg. Co.
Timken Roller Bearing Co., Tha,
Cataloged on page 215
Vascoloy-Ramet Corp.
Victor—see Victor Equipment Co.,
Victor Equipment Co.,
Western Rock Bit Mfg. Co., Cataloged on page 58

VACUUM FILTERS

See Filters

VACUUM PUMPS

See Pumps

VALVES

Allen-Sherman-Hoff Pump Co., The Dept. J, Cataloged en page Inside Front Cover American Car & Foundry Co. American Hard Rubber Co. AMPCO Metal, Inc.
AMPCO—see AMPCO Metal, Inc.
Barrett, Haentjens & Co.
Barrett, Sivalis & Bryson, Inc.
Bristol Co., The
Brown-Fayro Co.
Chase Brass & Copper Co.

Everiasting—see Everiasting Valve Co.

Everiasting Valve Co.
Fairbanks Co., The Fischer & Porter Co.
Flex-Check—see The Allen-Sherman-Hoff Pump Ce.
Flexible Valve Corp.
Flood City—see Flood City Brass & Electric Co.
Flood City Brass & Electric Co.
Foster—see Foster Engineering Co.
Foster—see Foster Engineering Co.
Golden-Anderson Valve Specialty Co. Co.
Goodrich Co., B. F.
Goyne Steam Pump Co.
Grinnell Co., Inc.
Grinnell-Saunders—see Grinnell Co., Grinnell-Saunders—see Grinnell Co.,
Inc.
Hose Accessories Co.
Hydraulic Supply Mfg. Co.
Klipfel—see Klipfel Valves Inc.
Klipfel Valves Inc.
Knox Mfg. Co.
Ledeen Mfg. Co., Cataloged on
page 64
Lunkenbeimer Co., The
Massee Grigsby—see Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelter Supply Co., The
Mine & Smelte R-P&C Valve Div., American Chain R-P&C Valve Div., American Chain Schaible Co., The United States Rubber Co. Watson-Stillman Co., The, Div. of H. K. Forter Co., Inc. Westinghouse Air Brake Co., In-dustrial Products Div.

VENTILATION EQUIPMENT AND **BLOWERS**

MINE FANS AND BLOWERS

MINE FANS AND BLOWERS

Aerodyne—see Jeffrey Mfg. Co., The
American Blower Corp.
Axivane—see Jey Mfg. Co.
Brown-Fayro Co., The
Buffalo Forge Co.
Cleveland Worm & Gear Co., The
Dwight-Lloyd—see Sintering Machinery Corp.
Hartzell Propeller Fan Co., Div.
Castle Hills Corp.
Homelite—see Homelite Corp.
Homelite—see Homelite Corp.
Homelite Corp.
Hg Electric Ventilating Co.
Ingersoil-Rand Co., Cataloged en
page 259, 251
Jeffrey Mfg. Co., The, Cataloged
on page 252
Joy Mfg. Co., Cataloged on page
213-214
Lamson Corp. 225-246
Lamson Corp.
Martin Fan & Blower Co.
Parsons Engineering Corp.
Peerless Electric Co., The
Propellair—see Robbins & Myers, Propellair—see Robbins & Inc.
Robbins & Myers, Inc.
Robta-Connersville Blower
Sawyer Balley Corp.
Sintering Machinery Corp.
Standard Elec. Mfg. Co., Inc.
Wattenbear Electric Internal

Westinghouse Electric International Co., Cataloged on page 261-264 VENTILATION PIPE AND TUBING

VENTILATION PIPE AND TUBING
American Brattice Cloth Corp.,
Cataloged on page 192
American Ventilating Hose Co.
Bemis Bro. Bag Co., Cataloged on
page 86
Bloflex—see Flexaust Co., The
Brown-Fayro Co.
Carlyle Rubber Co., Inc.
Coppus Engineering Corp.
DeLaval Steam Turbine Co.
Duraklad—see Stanley Co., Inc.,
William W.
Flexaust—see Flexaust Co., The
Flexaust Co., The
Flexaust Co., The
Flexaust Co., The
Flexaust Co., The

Coeur d'Alene Hardware & Foundry
Ca.
Convair, Inc.
Crane Co.
Duriron Co., Inc., The
Electric Steel Foundry Co.
Everlasting—see Everlasting Valve
Co.
Everlasting Valve Co.
Fairbanks Co., The
Fischer & Porter Co.

Mine Vent—see American Brattice
Cleth Cerp.
Parsons Engineering Corp.
Portovent—see American Ventilating Hose
Portovent—see Flexaust Co., The
Spiratube-Ayrtube — see Flexaust
Tubing Corp.
Stanley Co., Inc., William W.

VIBRATORS

See Bins, Chutes and Accessories

WASHERS, LOG

Allis-Chalmers Mfg. Co., Gen. Machy. Div., Cataloged on page 9, 289-298
Bodinson Mfg. Co.
Conveyor Co., The
Davis Foundry & Machine Works
Dwight-Lloyd—see Sintering Machinery Corp.
Eagle Iron Works
Georgia Iron Works
Georgia Iron Works
Georgia Iron Works
Link-Beit—see Link-Beit Co.
Link-Beit—see Link-Beit Co.
Link-Beit Co., Cataloged on page
WM 76, 77 (World Mining
Only) Link-Belt Co., Cataloged en page WM 76, 77 (World Mining Only) Lippmann Engineering Works Sintering Machinery Corp. Smith Engineering Works Pettibone Mulliken Corp. Washington Machinery Co. Webb Corp., The Yuba Mfg. Co., Cataloged en page 79

WELDING EQUIPMENT, SUPPLIES AND SERVICES

EQUIPMENT

Air Reduction Sales Co. American Brake Shoe Co. American Brake Shoe Co. American Manganese Steel Div. Amsco—see American Brake Shoe Co. Amaco—see Atherica.
Co.
Co.
Flood City—see Flood City Brass &
Electric Co.
Flood City Brass & Electric Co.
Harnischieger Corp., Cataloged on
page 73 page 73
Industrial Air Products Co., Cataloged on page 65
International General Electric Co., Cataloged on page Inside Front Cover (Werld Mining Only)
Lincoln Electric Co., Metal & Thermit Corp.
Mosebach Electric & Supply Co.
National Cylinder Gas Co.
Rexarc—see Sight Feed Generator Co.

Rexarc—see Sight Feed Generator Co.
Sight Feed—see Sight Feed Generator Co.
Sight Feed Generator Co.
Sight Feed Generator Co.
Smith Welding Equipment Co.
Smith Welding Equipment Co.
Smith Welding Equipment Co.
Smith Welding Equipment Co.
Junion Carbide and Carbon Corp.
Linde Air Products Company
Div.
Universal—see Universal Welder
Corp.
Universal Welder Corp.
Victor—see Victor Equipment Co.
Victor Equipment Co.
Westinghouse Electric International
Co., Cataloged on page 251-254
Worthington Corp.

HARD FACING

Air Reduction Sales Co. Alloy Rods Co. American Brake Shoe Co. American Brake Shoe Co.

American Manganese Steel Div. AMPCO-Trode—see Ampeo Metal, Inc. Inc.
Amsco—see American Brake Shoe
Co.
Coast Metals, Inc.
Industrial Air Products Co.
Industrial Overlay Metals
Lincoln Electric Co.
Metal & Thermit Corp.
National Cylinder Gas Co.
Rexare—see Sight Feed Generator
Co.

Co.

Sanford-Day Iron Works Inc.
Seaco—see Stuls-Sickles Co.
Sight Feed Generator Co.
Sight Feed Generator Co.
Stuls-Sickles Co.
Union Carbide and Carbon Corp.
Haynes Stellite Co. Div.
Union Carbide and Carbon Corp.
Linde Air Products Co. Div.
Victor—see Victor Equipment Co.
Victor—Equipment Co.
Wear-Arc—see Alloy Rods Co.
Westinghouse Electric International
Co., Cataloged on page 261-264

WELDING ROD

WILDING ROD

Air Reduction Sales Co.
All-State Welding Alloys Co., Inc.
Alloy Rods Co.
American Brake Shoe Co.
American Brake Shoe Co.
American Brase Stoe Co.
American Brass Co., The
AMPCO Metal, Inc.
AMPCO-Trode—see AMPCO Metal,

Amsco—see American Brake Shoe Co.

American Brake Shoe Co.
Arcaloy—see Alloy Rods Co.
Bridgeport Brass Co.
Bronse Arc—see Alloy Rods Co.
Harnischfeger Corp., Cataloged on page 3
Industrial Air Products Co., Cataloged on page 46
International General Electric Co., Cataloged on Inside Front Cover (World Mining Only)
Lincoln Electric Co.
Manganal—see Stulz-Sickles Co.
Manganale—see Stulz-Sickles Co.
Mickel-Arc—see Alloy Rods Co.
Phos-Trode—see Alloy Rods Co.
Phos-Trode—see Alloy Rods Co.
Revere Copper & Brass Inc.
Rexarc—see Slight Feed Generator Co.
Sight Feed Generator Co.

Revare—see Sight Feed Generator Co.
Sight Feed Generator Co.
Stula-Sickles Co.
Stureweld—see National Cylinder Gas Co.
Taylor-Wharton Iron & Steel Co.
Tool-Arc—see Alloy Rods Co.
Union Carbide and Carbon Corp.
Linde Air Froducts Co. Div.
Victor-Weld—see Victor Equipment Co.
Victor Equipment Co.
Weld-Arc—see Alloy Rods Co.
Westinghouse Electric International
Co., Cataloged on page 261-264

GENERAL SUPPLIES

Air Reduction Sales Co. Air Reduction Sales Co.
American Optical Co.
Eitherend—see Anderson Mfg. Co.,
Albert & J.M.
Eutectic Welding Alloys Corp.
Holmes & Bros., Inc., Robert
Industrial Air Products Co., Cataloged en page 68
International General Electric Co.,
Cataloged on page Inside Front
Cover (World Mining Only)
Lincoln Electric Co.
Matheson Co.

Lincoln Electric Co.
Matheson Co.
Mctal & Thermit Corp.
NCG—see National Cylinder Gas
Co.
National Cylinder Gas Co. Parker Safety Equip. Co.
Sight Feed—see Sight Feed Generator Co.
Sight Feed Generator Co.

Simplex Wire & Cable Co., Catalogod on page 18, 19
Union Carbide and Carbon Corp.
Linde Air Products Co. Div.
Universal Welder Corp.
Victor—see Victor Equipment Co.
Victor Equipment Co.
Westinghouse & Electric Corp.
Westinghouse & Electric International
Co., Cataloged on page 261-384

WELDMENTS, STEEL
Falk Corp., The Falk Corp.,

WINCHES

See also Hoisting Equipment

ELECTRIC

Bodinson Mfg. Co.
Brown-Fayro Co.
Chicago Pneumatic Tool Co.
Christian—see Christian Engineers,
J. D.
Christian Engineers, J. D.
Clyde Iron Works, Inc.
Dobbie Foundry & Machine Co.
Harnischfeger Cerp., Cataloged en
page 73
Joy Mfg. Co., Cataloged on page
215-246
Lake Shore Engr. Co.
Link-Belt—see Link-Belt Co.
Link-Belt Co., Cataloged on page
WM 76, 77 (World Mining
Only)
R & M—see Robbins & Myers, Inc.
Robbins & Myers, Inc.
Robbins & Myers, Inc.
Robbins & Myers, Inc.
Round & Son, Inc., David
Round Chain Cos.
Round Woodhouse Chain & Mfg. Co.
Shepard Niles Crane & Hoist Corne
Silent Holst & Crane Co.

Silent Hoist—Silent Hoist & Crane
Ca.
Silent Hoist & Crane Co.
Stephens-Adamson Mfg. Co., Cataloged on page 202
Superior-Lidgerwood-Mundy Corp.
Vulcan-Denver—see
Works (Denver) Vulcan Iron
Works (Denver), Cataloged on page 84
Webb Corp., The
Webster Mfg., Inc.
Yale and Towne Mfg. Co.
Materials Handling Division
Yuba Manufacturing Co., Cataloged
on page 79

on page 79

Beebe Bros.
Bodinson Mfg. Co.
Bodinson Mfg. Co.
Channon Corp., J. H.
Christian—see Christian Engineers, Channon Co., Christian See Christian See Christian L. J. D.
Christian Engineers, J. D.
Christian Engineers, J. D.
Christian Co.
Harnischfeger Corp., Cataloged on
page 73
Link-Beit Ce.
See Link-Beit Ce.
See Link-Beit Ce.
See Link-Beit Ce.
See Link-Beit Ce. Harnischieger Corp., Cataloged en page 73
Link-Belt —see Link-Belt Ce.
Link-Belt Co., Cataloged on page WM 76, 77 (World Mining Only)
Lug-All Co.
Round & Son, Inc., David Round Chain Cos.
Round-Woodhouse Chain & Mfg. Co., Cataloged on page 202
Superior-Lidgerwood-Mundy Corp.
Webb Corp., The
Yale and Towne Mfg. Co., Materials Handling Div.
Yuba Manufacturing Co., Cataloged on page 79

WIRE CLOTH

See Screens, Grizziles, and Accessories

WIRE ROPE

See Rope, Wire

XANTHATES

See Reagents and Chemicals

Manufacturer's Complete Names and Addresses are listed in Section II, last

SECTION II

Manufacturer's Index

Advertisers in Boldface

SECTION II contains an alphabetical list of the names and complete addresses of the principal manufacturers of specialized MINE-MILL-SMELTER equipment. The names of manufacturers who are repre-

sented in this issue by catalogs or advertisements are printed in BOLDFACE type, and the page numbers of their catalogs or advertisements are provided for your easy reference.

III.
Allia-Chalmers Mfg. Co., Gen. Machy. Div., Milwaukes I, Wis. 9.289-296
Allia-Chalmers Mfg. Co., Tractor Div., Bex 512, Milwaukes I, Wis. 14, 15
Louis Allia Co., The, 427 E. Stewart St., Milwaukee, Wis.
Alliaon Steel Mfg. Co., Seuth 19th Ave., Phenix, Ariz. 118
Alloy Rode Co., Lincoln Highway West, York, Pa.

Allicon Steel Mfg. Co., South 19th Ave.,
Pheenix, Ariz.

118
Alloy Rode Co., Lincoln Highway West, York,
Pa.

Alloy Steel & Metala Co., 1862 East 55th St.,
Lee Angelees Ss. Calif.

Alloy Rode Co., Parelica, Gulf Bidg., Pittsburgh 19, Pa.

Berlien Air Filter Co., 198 Central Ave.,
Louisville S. Ky.,
American Blower Corp., 6000 Russel St., Detroit 23, Mich.
American Brake Shoe Co., 230 Park Ave., New
York 17, N.Y.
American Brake Shoe Co., American Manganese Steel Div., 839 E. 14th St., Chicago
Heighte, Ill.
American Brake Shoe Co., Ramapo Ajax Div.,
109 North Wabash Ave., Chicago 2, Ill.
American Brake Shoe Co., Bo Co., So Church St.,
New York, N.Y.

American Car & Foundry Co., 30 Church St.,
New York, N.Y.

American Chain & Cable Co., Inc., American
Cable Div., Wilkes-Barre, Pa.

American Chain & Cable Co., Inc., American Chain Div., Princess & Charles Sts., York, Pw.

Ps. American Chain & Cable Co., Inc., Hazard Wire Rope Div., Wilkes-Barre, Ps. American Chain & Cable Co., Inc., R-P&C Div.,

Mope Div., Wilkes-Barre, Pa.
American Chain & Cable Co., Inc., R-P&C Div.,
Reading. Pa.
American Cidaset Corp., 87-89 Court St., Paterson, N.J.
American Cyanamid Co., Explosives Dept., 30
Rockefeller Plaza, New York 20, N.Y.
American Cyanamid Co., Mineral Dressing
Dept., 39 Beckefeller Plaza, New York 28,
N.J.
American Diamond Drill Co., 1975 S. Second
West, Sait Lake City, Utah
American Hard Rubber Co., 38 Worth St., New
York 15, N.Y.
American Hoist & Derrick Co., 63 S. Robert St.,
Bt. Paul, Minn.
American Instrument Co., Inc., Silver Spring,
Maryland
American-LaFrance-Foamite Corp., Elmira,
New York
American Locomotive Co., Schenectady 5, New
York
American Locomotive Co., Schenectady 5, New
York

Atlantio Tank Corp., 1207 Tonnele Ave., North Bergen, N.J. Atlas Car & Mfg. Co., Cleveland 19, Ohio 248 Atlas Powder Company, Wilmington 99, Dela-

ware
Autora Pump Co., 94 Loucks St., Aurora, Ill.
Autocar Division of the White Motor Co.,
Ardmore, Pa.

Bico. Inc., 3116 Vainalia Drive, Calif.
Biddle Co., James G., 1316 Arch St., Philadelphia T. Pa.
Bin-Dicator Co., The, 13946 Kercheval Ave.,
Detroit 16, Mich.
Bingham Pump Co., 2800 N.W. Front St.,
Portland, Ore.
Bird Machine Co., South Waipole, Mass.

21. Calif.

Bridgeport Brass Co., 30 Grand St., Bridgeport Conn.

Briggs & Stratton Corp., 2711 North Thirteenth St., Milwaukee 1, Wis.

Bright Star Industries, 600 Getty Ave., Clifton, N.J.

Bristol Co., The, Waterbury 20, Conn.

Broderick & Bascom Rope Co., Edmond & Airport Way, Seattle, Wash.

Brooks Lumber Co., Box 158, Bellingham, Wash. Brooks Lumber Co., Box 153, Bellingham, Wash.
Brookville Locomotive Works, Brookville, Pa.
Brown-Fayro Co., 940 Ash St., Johnstown, Pa.
Bruning Co., Inc., Chas., 4700 W. Montrose, Chicago, Ill.
Bruner & Lay Companies, Franklin Park, Ill.
Bruners Instrument Co. Ill.
Brunson Instrument Co., 1405 Walnut, Kansaa City 6, Mo.
Bucyrus-Erie Co., Bouth Milwaukee, Wis.
Buda Co., (Div. of Allis-Chalmers Mfg. Co.),
Harvey, Ill.
Buell Engineering Co., Inc., 70 Pine St., New
York 5, New York.
Buff & Buff Mfg Co., Jamaica Plain, Boston,
Mass. Mass.
Buffalo Forge Co., 490 Broadway, Buffalo, N.Y.
Buffalo Scale Co., Inc., 46 Letchworth St.,
Buffalo 13, N.Y.
B-I-F Industries, Inc., Providence 1, Rhode B-I-F Industries, inter-Inland
Bullard Co., E. D., 275 8th St., San Fran-ciaco 3, Calif.
Bunker Hill & Sullivan Mining & Concen-trating Co., Box 29, Kellogg, Idaho., 124
Burrell Corp., 2228 Fifth Ava., Pittaburgh 19, Pa.

Pa.

Butler Mfg. Co., 18th & Eastern Ave., Kanesa City 3, Mo.

Byers Manufacturing Co., The, Lock Box 890,
South Sycamore St., Ravenna, Ohio.

Byron Jackson Co., 2301 E. Vernon Ave.,
Los Angeles 54, Calif.

C-A Wood Preserver Co., 6625 Delmar Blvd., St. Louis 5. 560. C & D Batteries, Inc., Conshohocken, Pa. Caldwell Co., W. E. 2220 Brook St., Louis-ville 8, Ky. California Testing Laboratories, Inc., 619 E. Washington Blvd. Los Angeles 15, Cali-fornia Washington Bivd. Los Angeles 15, Cali-fornia California Texas Oil Co., Ltd., 280 Madison Ave., New York, N.Y. Calumet & Hecla, Inc., 1 Calumet Ave., Calu-met, Mich. Cambridge Wire Cloth Co., Cambridge, Mary-land

Cargille Laboratories, Inc., R. P., 117 Liberty
Bt., New York 6, N.Y.
Carlon Products Corp., 10225 Meech Ave.,
Cleveland 5, Ohio
Carlyle Rubber Co., Inc., 64 Park Place, New
York 7, N.Y.
Caterpillar Tractor Co., Peoria, Illinois
Central Frog & Switch Co., The, Box 95, Sta.
O, Cincinnati 8, Ohio
Central Mine Equipment Co. 6200 N. Perest Central Mine Equipment Co., 6200 N. Broad-way, St. Louis 15, Mo. Central Mine Supply Co., 218-224 South 3rd St., Mt. Vernon, III. Central Scientific Co., 1700 Irving Park Road, Chicago 13, Ill. Chicago 13, Ill.
Centrifugal & Mechanical Industries, Inc., 146
President St., St. Louis, Mo.
Chain Belt Co., 4701 West Greenfield Ava.,
Milwaukee 1, Wis.
Chain Belt Co., Baldwin-Duckworth Div., 349
Plainfield St. Springfield 2, Mass.
Chain Belt Co., Shafer Bearing Div., Downers
Grove, Illinois Champion Diamond Co., 333 East 46th St., New York 17, N.Y. Champion Lamp Works, 600 Broad St., Lynn, Mass. Mass.
Channon Corp., J. H., 1447-55 West Hubbard
St., Chicago 22, Ill.
Chapman & Wood, 586 Jefferson St., N. E.
Albuquerque, New Mex.
Chariton Laboratories, 2340 S. W. Jefferson
St., Portland 7, Ore. Chase Brass & Copper Co., Waterbury 20, Conn. Conn.
John Chatillon & Sons, 85 Cliff St., New
York 38, N.Y.
Chicago Bridge & Iron Co., 332 S. Michigan
Ave., Chicago 4, Ill.
Chicago Pneumatic Tool Co., 6 East 44th St.,
New York 17, N.Y.
Chleago Pulley & Shafting Co., 23 North Desplaines St., Chicago 6, Ill.
Christensen Diamond Products Co., 1937
South Second West, Balt Lake City,
Utah 253-246
Christian Engineers, J.D., 480 Potrero Ave., San Francisco 10, Calif. Chrysler Corp.-Dodge Div., 21500 Mound Road, Detroit 31, Mich. Clark Controller Co., The., 1146 E. 152nd St., Cleveland 10, Obio Clark Controller Co., The., 1146 E. 152nd St.,
Cleveland 10, Oblo
Clark Electronic Corp., Box 165, Palm
Springs, Calif.
Clark Equipment Co., Construction Machinery
Div., 350 Miller Rd. Benton Harbor, Mich.
Clarkson Co. The, 254 Market St., San Francisco 4, Calif.
Clarkson Mfg. Co., Mine Rd., Nashville, II.
Cleveland Vibrator Co., The, 2528 Clinton
Ave., Cleveland 13, Obio
Cleveland Wire Cloth & Mfg. Co., 3573 E.
75th St., Cleveland 5, Ohio
Cleveland Worm & Gear Co., The, 3249 East
S0th St., Cleveland 4, Ohio
Climax Engine & Fump Mfs. Co., 208 South
La Salle St., Chicago 4, III.
Clipper Belt Lacer Co., 974 Front Ave.,
N.W., Grand Rapids 2, Mich.
Clow & Sons, James B., 201-299 N. Talman
Ave., Chicago 12, III.
Clyde Iron Works, Inc., Duluth 1, Mich.
Coast Mfg. & Supply Co., Box 7, Little Ferry,
N.J.
Coates Steel Products Co., P. O. Box 185,
Greenville, III. N.J.
Coates Steel Products Co., P. O. Box 186,
Greenville, Ill.
Coeur d'Alene Hardware & Foundry Co., Box
989, Wallace, Idaho
Coffing Hoist Co., 800 Walters St., Danville,
Ill.

Crane Ill. Crane Co., 886 S. Michigan Ave., Chicago S. III.
Crane Puller Co., Waltham, Mass.
Crescent Belt Fastener Co., 480 Lexington Ave., New York 17, N.Y.
Crichton Co., 1006 U. S. Nat'l Bank Bldg., Johnstown, Pa.
Crucible Steel Co. of America, P. O. Box 88, Pittsburgh 80, Pa.
Cullman Wheel Co., 1344 W. Altgeld St., Chicago 14, III.
Cammins Eagine Co., Inc., Columbus, Ind. 4, 5
Curtis Mfg. Co., 1906 Kienlen Ave., St. Louis 20, Mo. Assay Office and Laboratory, 105
South Santa Fe, El Paso, Texas
Culter-Hammer, Inc., 1410 W. St. Paul Ave., Milwaukee 1, Wis.

Dorr Co., The, Barry Place, Stamford, Conn. 12 Derri Ce., The, Barry Place, Stamford, Cenn.

12
Dorsey Trallers, Elba, Alabama
Dew Chemical Co., The, Midland, Mich. . . . 8
Dravo Corp., Neville Island, Pittaburgh 25, Pa.
Dresser-Stacey Co., Stacey Bros. Div., \$586
N Vine St., Cinelnanti 16, Ohio
Drott Mfg., Corp., 3641 W. Wisconsin Ave.,
Milwaukoe 8, Wis.
Drullard Co., Howard, 1026 Folsom St., San
Francisco S, Calif.
duPont de Nemours & Co., E. I., Electrochemicals Dept., Wilmington, Del.
Chemicals Dept., duPont Bidg., Wilmington, Del.

Chemicals Dept., duPont Bldg., Wilming-ton, Del.
duPont de Nemours & Co., E. I., 10th & Mar-kets Sts., Wilmington, Del.
Duquesne Mine Supply Co., Pittsburgh 9, Pa.
Duriron Company, Inc., P.O. Box 1019, Day-ton 1, Ohlo
Duro-Test Corp., 2321 Hudson Blvd., North
Bergen, New Jersey

Eagle Iron Works, 185 Holcomb Ave., Des Moines, Iowa
Eastern Electro-Casting Co., Ltd., 15 St.
Joseph Bt., Lachine, Quebee
Easton Car & Construction Co., Easton, Pa.
Eberbach Corp., 200 E Liberty St., Ann Arbor
Mich.,
Economy Fuse & Mfg. Co., Greenview Ave.
at Diversey Pkwy., Chicago, Ill.
Edison, Inc., Thomas A., Edison Storage Battery Div., West Orange, N.J.
Eadleott Forging & Mfg. Co., 1901 North St.,
Endicott, N. Y.
Edwards Co., Inc., Norwalk. Conn.
Edwards & Co., H. D., 175 E Larned St.,
Detroit, Mich.
Edwards Wire Rope, P.O. Box 518, San Francisco, Calif.
Elmes Corp., P.O. Box 390, Sait Lake City, 18
Elmes Corp., P.O. Box 390, Sait Lake City, 18
Elmes Corp., P.O. Box 390, Sait Lake City, 18

Blvd., Helly Blvd., 1836 Bross.
Enley Products, Inc., 1836 Bross.

11. N.Y.
Ensign-Bickford Có., Simebury, Conn.
Enterprise Wheel & Car Corp., P.O. Box 181,
Bristol, Va.
Equiptoint Engineers Inc., 41 Sutter St.,
San Francisco 4, Calif.
Erics Mg. Co., 49 Magnet Drive., Eric, Pa.,
Easex Wire Corp., Paranite Wire & Cable
Div., 1601 Wall Street, Fort Wayne 6,
Indiana Oll Co., 18 West 51st St.

Indiana

Easo Standard Off Co., 15 West 51st St.,
New York 19. N. Y.

Ruclid Division, General Motors Corp., 241-244

Eutestic Welding Alloys Corp., 40 Worth St.,
New York 18, N. Y.

Everlasting Valve Co., 49 Fisk St., Jersey
City 5, New Jersey

Exolon Co., The, East Miagara St., Tonawanda,
N. Y.

328

P A B Mfg. Co., 1249-67th Street, Oakland 8, Calif.

Fairbanks Co., 393 Lafayette St., New York 8, New York

Fairbanks, Morse & Co., 600 S. Michigan Ava., Chicago 8, Ill.

Fairchild Aerial Surveys, Inc., 224 E. 11th St., Los Angeles, Calif.

Falk Corp., 3944 W. Canal St., Milwankes 8, Wis. Chicago 5, III.

Fairchild Aerial Surveys, Inc., 224 E. 11th St.,
Los Angeles, Calif.

Falk Corp., 3094 W. Canal St., Milwaukee S.,
Wis.

Wis.

Farmers Engr. & Mfg. Co., Irwin, Pennsylvania

Farrel-Birmingham Co., Inc., Ansonia, Com.,
Farris Engineering Corp., 400 Commercial

Ave., Palisades Park, N. J.

Fate-Boot-Heath Co., The, Plymouth, Ohio
Federal Motor Truck Co., 5780 Federal Ave.,
Detroit 9, Mich.

Detroit 9, Mich.

Pederal Pipe & Tank Co., 6851 East Marginal
Way, Seattle, Wash.

Chicago 7, III.

Fen Machine Co., 28914 Lakeland Blvd., WickIlffe, Ohio
Fenwick Mfg. Co., 134 Rome St., Newark 5,
N. J.

Fitration Engineers Inc., 155 Oraton St.,
Newark 4, N. J.

Fitration Engineers Inc., 155 Oraton St.,
Newark 4, N. J.

Firstone Tire & Rubber Co., 1200 Firestone
Pkwy., Akron 17, Ohio
Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.

Fisher Research Laboratory, Inc., 1961 University Ave., Palo Alto, Calif.

Fisher Research Laboratory, Inc., 1961 University Ave., Palo Alto, Calif.

Fiske Brothers Refining Co., Lubriplate Div.,
129 Lockwood St., Newark 8, N. J.

Fiexhels Ettel Laboratory, Inc., 1961 University Ave., Palo Alto, Calif.

Fiske Brothers Refining Co., Lubriplate Div.,
129 Lockwood St., Newark 8, N. J.

Fiexhels Ettel Laing Co., 4607 Lexington St.,

Chicago 44, III.

Fexible Valve Corp., 400 Commercial Ave.,
Palisades Park, N. J.

Fiexaust Co., 100 Park Ave., New York 17,
N. Y.

Plexhibe Tubing Corp., Guilford, Conn.

Flood City Brass & Electric Corp., Messenger
& Elder St., Johnstown, Pa.

Food Machinery & Chemical Corp., Pevrless
Pump Div., 301 West Avenu 26, Loe

Angeles, Calif.

Foote Bros. Gear & Machine Corp., 4545 South

Western Blvd., Chicago 9, III.

Ford Motor Co., 3561 Schaeffer Rd., Dearborn,
Mich.

Foote Tengineering Co., 835 Lehigh Ave.,
Union, N. J.

Footer Co., L. B., P.O. Box 1647, Pitteburgh
30, Pa.

Footer Co., L. B., P.O. Box 1138, Tren
ton 6, N. J.

Fourher Wheel Drive Auto Co., 12th Street,
Clintonville, Wis.

Fuller Mg. Co., Catasauqua, Pa.

Fuller Mg. Co., Catasauq

Ga.
Fulton Mfg. Corp., 206 Michigan St., Toledo,
Ohio Fyr-Fyter Co., 221 Crane St., Dayton, Ohio

General Detroit Corp., 2272 E. Jefferson Ava., Detroit 32, Mich. General Dynamics Corp., Electro Dynamics Div., 183 Avenue A, Bayonne, New Jer-

General Electric Co., Schenectady 5, New York General Electric Co., Plainville, Conn. General Electric Co., Carboloy Dept., Box 237, Roosevelt Park Place, Detroit 32, Mich. General Electric Co., Construction Materials Division, 1235 Boston Ave., Bridgeport 2,

Division, 1236 Boston Ava., Bridgepore a. Conn.

General Electric Co., International, 578 Lexington Ava., N. Y. 22, Inside Front Cover (World Mining Only)

General Electric Co., Lamp Div., Nela Park, Cleveland 13, Ohio

General Eculpment & Mfg. Co., 129 S. Campbell St., Louisville, Ky.

General Metals Corp., Enterprise Engine & Machiner Co., 18th & Florida Streets, Machiner Co., 18th & Florida Streets, General Moore Corp., Deleo Products Div., 525 First St., Dayton, Ohio

General Motora Corp., Detroit Diesel Engine Div., 1346 W. Outer Drive, Detroit 28, Mich.

Goldak Co., 1, Calif.

St., Akron Co., 305 Bowman Co., Scholar Coman-Rup Co., 305 Bowman Co., Scholar Co., Canam Blds., Lima, Chio Gramm Trailer Corp., Gramm Chicago, Ohio Craver Tank & Mfg. Co., Inc., East Chicago, Graver Tank & Mfg. St., Schneon St.,

Ohio
Graver Tank & Mfg. Co., Inc., East Chicago, Indians
Gray Instrument Co., 64 W. Johnson St., Phils. 44, Pa.
Graybar Electric Co., Inc., 420 Lexington Ave.,
New York 17, N. Y.
Great Lakes Electric Mfg. Co., 17 S. Desplaines St., Chicago, Ill.
Green Fire Brick Co., A. P., Mexico, Mo.
Greene. Tweed & Co., North Wales, Pa.
Greensburg Machine Co., Greensburg, Pa. 94
Greeg Co., Ltd., The, 19 Ractor St., New York
6, N.Y., WM 26, 21 (World Mining Only)
Grinnell Co., Inc., 250 West Exchange St.,
Providence 1, R. I.
Gulf Oil Corp—Gulf Refining Co., Gross St.
49, P.R., Pittsburgh 24, Pa.
Gundlach Machine Co., T. J., 226 Centerville
Ave., Belleville, Ill.
Gurley, W. & L. E., 514 Fulton St., Troy, N.Y.
Guston-Bacon Mfg. Co., Kansas City, Mo.
Gwilliam Co., 360 Furman St., Brooklyn 2,
N. Y.

H-B Instrument Co., Inc., American & Bristol Sts., Philadelphia 40, Pa. Hack Engineering Co., 124 Wasse Market, Denver, Colo. Hales Co., W. M., Box 65, 700 Commerce St., Danville, III.

Mich. Hardinge Co., Inc., 240 Arch St., York, 97, 103

Pa. 97, 163

Hardnoeg Div., Cardox Corp., 807 N. Michigan
Ava., Chicago 1, Ill.

Harnischfeger Corp., 4409 W. National Ava.,
Milwaukes 48, Wis. 78

Harper Electric Furnace Corp., Nilagara Falls,
N. Y.

Hartzell Propeller Fan Co., Div. Castle Hills Corp., 8 Downing St., Piqua, Ohio Hauck Mfg. Co., 124-138 Tenth St., Brooklyn 15, N. Y.

Hauser-Stander Tank Co., 4838 Spring Grove Ave., Cincinnati 32, Obio Havlick Diamond Drilling Co., Inc., 2703 N. Pittsburg St., Spokane 26, Wash.

Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.

Haynes Stellite Co., Harrison & Lindsay Sts.,
Kokomo, Ind.
Hell Co., Milwaukee I, Wis.
Helmick Foundry—Machine Co., P.O. Box 71,
Fairmont, W. Va.
Hendrick Mfg., Co., Carbondale, Pa.
Hercules Motors Corp., 101 11th St. S.E.,
Canton 2, Ohio
Hercules Powder Co., Wilmington 99, Del.
Hercules Steel Products Corp., Sherman St.,
Galion, Ohio
Hertner Electric Ca., 12690 Elmwood Ave.,
N.W., Cleveland 11, Ohio
Hevi Duty Electric Co., 4212 W. Highland
Blvd., Milwaukee 1, Wis.
Hewitt-Robins Inc., 666 Glenbrook Rd., Stamford, Conn.
Hewitt-Robins Inc., 666 Glenbrook Rd., Stamford, Conn.
Hewitt-Robins Inc., 655 Fort Pitt Blvd.,
Pittaburgh 22, Pa.
Hill & Jude, Assayers, 860 Pearl St., Boulder,
Colo.
Hilman Co., C. Kirk, 3201 First Ava. Scuth

Hill & Jude, Assayers, 800 Pearl St., Boulder, Colo.

Killman Co., C. Kirk, 3201 First Ave. South, Scattle 4, Wash.

Hirsch Bros. Machy. Co., P.O. Bex 226, El Pasco, Tex.

Hockensmith Corp., Penn, Pennsylvania Bros. Drilling Co., 120 E. Mahoning St., Punxsutawney, Ps.

Hoffman Bros. Drilling Co., 120 E. Mahoning St., Punxsutawney, Ps.

Hoffman Mchy. Corp., V. S., 106 Fourth Ave., New York 3, N. Y.

Holly Pneumatic Systems Inc., 15 East 40th St., New York 17, N. Y.

Holman Bros. (Canada) Ltd., Kent Ave., Kitchener, Ontario

Holmas Bros., Ltd., Camborne, England

Holmas Bros., Ltd., Camborne, England

Holmas Bros., Ltd., Camborne, Kitchener, Ontario

Holman Bros., Ltd., Camborne, England

Holmes Bros., Inc., Robert, 2436 Junction Ave., Danville, Ill.

Homelite Corp., Fort Chester, New York

Homer Mfg. Co., 142 East Pearl St., Lima,

Ohlo

Ohlo

Honan-Crane Corp., Subsid. of Houdaille-Her-

Ohio
Honan-Crane Corp., Subsid. of Houdaille-Hershey Corp., Lebanon, Indiana
Hossfeld Mfg. Co., 460-462 West Third St.,
Winona, Minn.
Hough Co., The Frank G., Libertyville, Ill.
Houghton & Co., E. F., 308 W. Lehigh Ave.,
Philadelphia 33, Pa.
Howe Scale Co., Rutland, Vermont
Hamphers, Investor, Co., Engineering Div.

Humphreys Investment Co., Engineering Div., 510 First National Bank Bldg., Denver 3, Colo. 17

Ilg Electric Ventilating Co., 2850 N. Craw-ford Ave., Chicago 41, III.
Illinois Powder Mfg. Co., 134 N. 4th St., St. Louis, Mo.
Imperial Cantrell Mfg. Co., Box 538, Jellico, Tenn.

Tenn.
Imperial Electric Co., 63 Ira Ava., Akron 9,
Ohio

Kennametal Inc., Latrobe, Pa.
Kannedy-Van Saun Mfg. & Rng. Cerp., Two
Park Ave., New York 16, N.Y....... 391
Kensington Steel Co., 695 Kensington Ave.,
Chicago 28, Ill.
Kenyon Machinery Co., 635 Walnut St., Denver 4, Colo.
Kerite Co., 30 Church St., New York 7, N.Y.
Kerrigan Iron Works, Inc., 1083 Herman
St., Nashville 2, Tenn.
Keuffel & Esser Co., 300 Adams St., Hoboken, N.J.
Keystone Driller Co., 2021 8th Ave., Beaver
Falls, Pa.
Keystone Lubricating Co., 21st Clearfield &
Lippincott Sts., Philadelphia 23, Pa.
Keystone Steel & Wire Co., Peoris, Ill.
Kidde, Walter & Co., Inc., 656 Main St.,
Belleville 9, N.J.
Kilbourne & Jacobs Mfg. Co., Columbus 16,
Obio
Kirk & Blum Mfg. Co., 3100 Forrer St.,
Cincinnati 9, Ohio
Kicin, Mathias & Son, 3200 Belmont Ave.,
Chicago 19, Ill.
Kipfel Valves Inc., 1075 Lincoln Ave., Hamilton, Ohio
Klockner-Humboldt-Deuts Ag., Koln, Germany
Knox Mfg. Co., 220 W. Clinton Ave., OakIya, N.J.
Koebel Dlamond Tool Co., 9456 Grinnell Ave.,
Detroft 13, Mich.
Koehring Co., 3026 West Concordia Ave.,
Milwunkee 16, Wis.
Kolton Electric Mfg. Co., 123 New Jersey
Rallroad Ave., Newark, N.J.
Koppers Co., Fast Coupling Dept., 600 Beott
St., Baltimore 3, Md.
Koppers Co., Inc., Wood Preserving Div.,
Koppers Bldg., Pittaburgh 19, Pa.
Kurs & Root Co., 232 E. North Island St.,
Appleton, Wis.

Kaiser Aluminum & Chem. Corp., 1924
Broadway, Oakland 12, Calif.
Kato Engineering Co., Mankato, Minn.
Keegel, C. P., 707 B. 6th Bt., Las Vegas,
Nevada 119

LaBour Co., 1555 Sterling Ave., Elkhart, Ind.
Laclede-Christy Co., 2000 Hampton Ave., St.
Louis 19, Mo.
La Crosse Trailer Corp., La Crosse, Wice.
Lake Shore Electric Corp., 276 Willis Bt.,
Bedford, Ohio
Lake Shore Engineering, Iron Mtn., Mich.
Lakeside Bridge & Steel Co., 5800 N. 33rd
St., Milwaukee 9, Wis.
Lamson & Sessions Co., 1971 West 85th St.,
Cleveland 2, Ohio
Lamson Corp., Lamson St., Syracuse 1,
New York
Landis Steel Co., Box 248, 116 West A St.,
Ficher, Okla.
Laughlin Co., Thomas, 143 Fore St., Portland
6, Maine
Lawrence Pump & Engine Co., Canal &
Marston Sts., Lawrence, Mass.
Lawrence Pumps Inc., 571 Market St., Lawrence, Mass.
Laylander, Philip A., Box 241, Fallen,
New.
Los Angeles 18, Calif.
Ledsen Mg. Co., 1666 S. Ban Pedre St., Las
Angeles 15, Calif.
Ledsen Mg. Co., 155 Ave of the Americas,
New York 13, N.Y.
Lee Royler Co., 751 Lincoln Ave., Charleroi, Pa.
Lee Robber & Tire Corp., Republic Rubber
Div., Albert St., Youngstown, Ohio
Leetonia Tool Co., Main St., Leetonia, Ohio
Leetonia Tool Co., Tibi S., Milwaukee 14,
Wila.
Leschen Wire Bope Div., H. K. Parter Ce.

\$599 Kennerly Ave., St. Louis 12, Mo. 81
Lefourneau-Westinghouse
Co., 2301 N.
Adams St., Feroria, Ill
Lima Electric Co., Dayton 1, Ohio
Lindergh Engra. Co., Fisher Furnace
Div., 2460 W. Rubbard St., Chlesgo, Ill.
Linde Air Products Co., 50 E. 43nd St., New
York 17, N.Y.

[World Mining Section-329]

cage 1, Ill.

Cage 1, Ill.

WM 78, 77

Link-Belt Speeder Corp., 1201 Sixth St.,

S.W., Cedar Rapids, Lowa
Lippwann Engineering Works, 4603 W.

Mitchell St., Milwaukee 14, Wls.

Lister-Blackstone, Inc., 430 Lexington Ave.,

New York 17, N.Y.

Long Co., The, Box 331, Oak Hill, W. Va.

Longyear Co., E. J., 1700 Foshay Tower,

Minneapolis 2, Minn.

Louden Machinery Co., Fairfin, Ohio

Louden Machinery Co., Fairfin, Ohio

Louden Machinery Co., Fairfield, Iowa

Lovejor Flexible Coupling Co., 5000 W. Lake

St., Chicago 44, Ill.

Lowell Insulated Wire Div., 171 Lincoln St.,

Lowell Wrench Co., 54 Commercial St.,

Worcester S, Mass.

Ludlow-Saylor Wire Cloth Co., 608 Bouth

Newstead Ave., St. Louis 10, Mo.

Lafkin Rule Co., Baginaw, Mich.

Log-All Co., 331 E. Lancaster, Wynnewood, Pa.

Lakens Steel Co., Coatesville, Pa.

Lankenheimer Co., Beekman St. & Waverly

Ave., Cincinnati 14, Ohio

Larla Engineering Co., 500 Fifth Ave., New

York 36, New York

Marble Card Electric Corp., Buperior Bt.,
Gladstone, Mich.
Marion Metal Products Co., Cheney Ava.,
Marion, Ohio
Marion Power Shovel Co., Marion, Ohio ... 2
Markley Dust Control System, Inc., 80 Bnyder Road, Ramsey, M.J.
Marland Oneway Clutch Co., 861 Hillgrove
Ave., LaGranga, Ill.
Marsh Engineering Co., E. F., 4824 West
Clayton Ave., 8t. Louis 10, Mo.
Martin Engineering Co., 704 Rose St., Kewane, Ill.
Martin Fan & Blower Co., 4684 West 21st
Flace, Chicago 80, Ill.
Martindale Electric Co., 1382 Hird Ava.,
Cleveland 7, Ohio
Maryland Metal Building Co., Inc., McComas
Bt., West of Hanover St., Baltimore,
30, Md.
Master Electric Co., 128 Davis Ava., Dayton,
Ohio Merrill Co., 582 Market St., San Francisco
4, Calif.
Metal & Thermit Corp., 100 E. 42nd St., New
York 17, N.Y.
Metron Instrument Co., 432 Lincoln St.,
Denver, Colo.
Mexico Refractories Co., Mexico, Mo.
Meyers Bafety Switch Co., Inc., 423 Tehams
St., San Francisco 3, Calif.
Mitchell Mfg. Co., 101 Sherman Ave., New
York 34, N.Y.
Michigan Pipe Co., 506 Phoenix Bldg., Bay
City, Mich.
Michigan Tool Co., Manistee Iron Works,
Manistee, Mich.
Michle Printing Press & Mfg. Co., StarKimble Motor Div., 200 M. Bloomfield
Ave., Bloomfield, N.J.
Micro Switch, div. of Minneapolis-Honeywell
Regulator Co., Freeport, Ill.
Mill & Mine Supply, Inc., 2700 4th Ave., B.,
Seattle 4, Wash.
Miller, Arnold H., 120 Broadway, New York
City 5, N. Y.
Miller Equipment Co., Inc., 12th & New Sts.,
Franklin, Pa.
Mills Iron Works, Inc., 929 North Main City 5, N. Y.

Miller Equipment Co., Inc., 12th & New Sts.,
Franklin, Pa.

Mills Iron Works, Inc., 929 North Main
St., Los Angeles, Calif.

Minerals Engineering Co., 891 4th Ave.,
Grand Junction, Colo.

Minerals Engineering Co., 417 S. Hill St.,
Los Angeles 18, Calif.

Mineree Corp., 120 Broadway, New York,
N.Y.

Nagle Pumps, Inc., 1250 Center Ave., Chicago Heights, III.
National Airoil Burner Co., 1234 E. Sedgley Ave., Philadelphia 34, Pa.
National Cylinder Gas. Co., 840 N. Michigan Ave., Chicago II, III.
National Cylinder Gas. Co., 840 N. Michigan Ave., Chicago II, III.
National Electric Products Corp., 2 Gatsway Center, Pittsburgh 22, Pa.
National Fluer Media Corp., New Haven 14, Conn.
National Flues & Fewder Co., 3891 Delgany St., Denver S, Colorado Control Control Mine Bervice Co., P. O. Box 24, 19400 Quincy Ave., Cleveland, 4, Ohie. 1 National Mine Bervice Co., P. O. Box 22, Beckley, W. Va.
National Powder Co., Eldred, McKean County, Pa.
National Bupply Ca., P. O. Box 416, Pittsburgh 30, Pa.
National Supply Co., Engine Div., 1461 Sheridan Ave., Springfield, Ohio National Tank & Pipe Co., 2391 N. Columbia Elvd., Portland 17, Ore.
Navier Pipe Co., 121 E. 92nd St., Chicago 19, III.
Neu Machinery Co., H. T., 57 Post St., San Francisco, Calif.
New Jersey Meter Co., 120 Waynewood Park, Plainfield, New Jersey
[World Mining Section—330]

New World Exploration, Res. & Dev. Corp., 6547 Aqueduct Ave., Van Nuys, Calif.
New York Belting & Packing Co., 1 Market
N.Y., Passale, N. J.
N.Y., Passale, N. J.
N.Y., Passale, N. J.
N.Y., Passale, N. J.
New York 17, N.Y.
Newark Wire Cloth Co., 270 Verona Ava.,
Newrik 4, N.J.
Newport Industries, Inc., 280 Park Ave.,
New York, N.Y.
Nishola Engineering & Research Corp., 70
Pine St., New York 5, N.Y.
Nolan Co., Bowerston, Ohio
Nordberg Mfg. Co., 3673 South Chase Ave.,
Milwankee 1, Wis.
North American Mfg. Co., 4455 East Tist
St., Cleveland 5, Ohio
North American Phillips Co., 100 E. 42nd
St., New York 17, N.Y.
North American Phillips Co., 100 E. 42nd
St., New York 17, N.Y.
North American Phillips Co., 100 E. 42nd
St., New York 17, N.Y.
North American Refractories Co., 1012
Nat'l. City E. 6th Bidg., Cleveland 14,
Ohio
Northern Conveyor Co., 9420 Barberton Ave.,
Cleveland 2, Ohio
Northwest Engr. Co., 135 S. LaSalle St.,
Chicago 3, Ill.
Northwestern Electric Co., 1765 N. Springfield Ave., Chicago 47, Ill.
Norton Co., Worcester 6, Mass.
Norwalk Co, Inc., North Water St., Seuth
Norwalk, Conn.
Novo Engine Co., 702 Porter St., Lansing 5,
Mich.
Nuclean Instrument & Chemical Corp., 223
W. Erie St., Chicago 10, Ill.
Nucleonic Co. of America, 407 Union St.,
Brooklyn 81, N.Y.

Ogden Iron Works Co., Ogden, Utah
Ohio Brass Co., 380 North Main St., Mansfield, Ohio
Ohio Carbon Co., 12508 Berea Rd., Cleveland 11, Ohio
Ohio Gresse Co., 514-519 N. Spring St.,
Loudouville, Ohio
Ohio Electric Mfg. Co., 5909 Maurice Ave.,
Cleveland 27, Ohio
Oligear Co., 1560 W. Pierce St., Milwaukee
4, Wis.
Okonite Co., Hasard Insulated Wire Works
Oliv., 72 Hazle St., Wilkes-Barre, Pa.
Olin Industries, Inc., Explosives Div., East
Alton, Ill.
Oliver Corp., 400 W. Madison St., Chicago
6, Ill.
Oliver Corp., A. B. Farquaar Div., 142 N.
Duke St., York, Pa.
Oliver Iron & Steel Corp., S. 10th & Muriel
Bta., Pittsburgh S., Pa.
Oliver United Filters, Inc., 2900 Glascock
St., Oakland 1, Calif.
Omega Machine Co., 346 Harris Ave., Providence 1, Rhode Laland
Onand Sons, Inc., D. W., University Ave.,
S. E. at 28th, Minneapolis 14, Minn.
Oronite Chemical Co., 38 Sansome St., San
Francisco, Calif.
Ogood-General, P. O. Box 518, Marion, Ohio
Osmose Wood Preserving Co., of America,
Inc., 980 Efficit St., Buffalo 9, N.Y.

Palmer & Decker, 163 W. Lime St., Bishop, Calif.
Palmer-Bee Co., 1701 Poland Ava, Detroit 12, Mich.
Pangborn Corp., Hagerstown, Maryland Paragon-Revolute Corp., 77 S. Ave., Rochester 4, N.Y.
Parker Safety Equip. Co., 785 Lyons Ave., Irvington 11, N.J.
Parsons Engineering Corp., 4590 Beidler Rd., Willoughby, Ohio
Partrick & Wilkins Co., 51 North 7th St., Philadelphia 6, Pa.
Patrick, Inc., R. S., Sellwood Bldg., Duluth 2, Minn.

III.

Plumner Mfg. Co., W. A., 752 S. San Pedro
St. Los Angeles 14, Calif.

Pollock Co., Wm. B., 101 Andrews Ave.,
Youngstown, Ohio

Porter Co., Inc., H. K., Watson Stillman Co.,
Div. of, 109 Aldens Road, Roselle, N.J.

Portland Woolen Mills, Inc., Industrial Fabrics Div., P. O. Box 2620, Portland 3,
Ore.

Poat Co., Frederick, 155 E. Ohio, Chicago,
III.

Quaker Rubber Co., Philadelphia 24, Pa.
"Quick-Way" Truck Shovel Co., P. O. Box
1800, 2401 E. 40th Ave., Denver, Colo.
Quigriey Co., Inc., 529 5th Ave., New York
17, N.Y.

Radiac Co., Inc., 489 5th Ave., New York
17, N.Y.
Rampo Ajax Div., American Brake Shoe Co.,
332 8. Michigan Ave., Chicago 4, Ill.
Raniville Co., F., 241 Pearl St., N. W. Grand
Rapids 2, Mich.
Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N.J.,
Ray-Q-Vac Co., 212 E. Washington Ave.,
Madion 10, Wis.
Reading Crane & Hoist, Reading, Pa.
Ready Power Co., 8228 Grand River Ave.,
Detroit 8, Mich.
Recoveries, Inc., 2614 N. E. 25th Ave., Portland 12, Ora.
Reeves Pulley Co., 1225-7th St., Columbus,
Rading Tay, & Chemical Corp., 1415. Mer.

Shriver & Co., Inc., T., 862 Hamilton St.,
Harrison, New Jersey
Sight Feed Generator Ce., West Alexandria,
Ohio
Sikes Co., S. R., 1028-South 3rd St., Minneapolis 15, Minn.,
Silent Hoist & Crane Co., 841 63rd St.,
Brooklyn 39, N.Y.
Simonds Worden White Co., Dayton 7, Ohio
Simplex Wire & Cable Co., Cambridge,
Mass.
Simplicity Engineering Co., Durand, Mich.
Sintering Machinery Corp., Netcong, N.J.
SKP Industries, Inc., Front St. & Erie
Ave., Philadelphia 32, Pa.
Skookum Co., 8504 N. Crawford St., Portland 3, Ore.
Bly Mfg. Co., W. W., 4700 Train Ave., Cleveland 2, Ohio
Smidth & Co., F.L., 11 West 42 St., New
York 38, N.Y.
New York 19, N.Y.
Smit & Sons, Inc., J. K., Murray Hill, New
Jersey
Smith Emery Co., 781 East Washington Bivd. Springfield Boiler Co., 19th & Capitol Ave., Springfield, Ill. Stanley Co., Inc., Wm. W., 401 Broadway, New York 18, N.Y. Stardrill-Keystone Co., 920 17th St., Beaver Falls, Pa. Wire Screen & Iron Works, Inc., 15 San Fernando Road, Los Angeles , Calif.

Stearns Roger Mfg. Co., 1720 California St., Denver 2, Colo. 214 Steelcraft Mfg. Co., Blue Ash Road, Ross-moyne, Ohio Stein, Hall & Co., Inc., 285 Madison Ave., N.Y. Stephan Corp., 2022 Broadway, Sacramente 18, Calif. 265

[World Mining Section-331]

Udy, Marvin J., 546 Portage Road, Niegara Palls, N.Y. 119 Ultra-Violet Producers, Inc., 148 Pasadona Ave, S. Pasadona, Calf. 48 Union Carbide & Carbon Corp., Haynes Sealitie Div., 725 S. Lindsay St., Kohome, Ind.

Wagner Electric Corp., 6400 Plymouth Ava., St. Louis 14, Mo., Valker & Whyte, Inc., 460 Pearl St., New York 7, N.Y.
Walvord, Inc., 0. W., 200 Detroit St., Denver 6, Cele.

119 Ward Leonard Electric Co., 115 MacQueesten Parkway South, Mount Vernon, M.Y.
Warron-Knight Co., 126 N. 12 St., Philadelphia 7, Pa.
Warron Steam Pump Co., Inc., Warren, Mass.
Warsop Power Tools, Inc., P. O. Box 168, Danbury, Com.,
Wasatch Ball Foundry, Inc., 831 W. 7th South, Sait Lake City 4, Utals.
Washington Iron Works, 1500 6th Ava. S., Seattle 4, Wash.
Washington Machinery Co., 7830 East Marginal Way, Seattle 8, Wash.
Watlow Electric Mrg. Co., 1378 Ferguson Ave., St. Louis 14, Mo.

XYZ



ORE DRESSING EQUIPMENT FOR IMPROVED METALLURGY



WEMCO S-H CLASSIFIER

For wet classification; washing of coals, iron ores, sands and other industrial materials; desliming and dewatering of ores, minerals and chemical products. 12" to 96" diameters, simplex or duplex, lengths to suit operation, 3 tank styles for optimum pool area. 1, 2 or 3 spiral flights per shaft for desired sand capacity, anti-friction bearings throughout, hydraulic lifting device.



WEMCO MOBIL-MILL

A complete, compact, semi-portable HMS plant. Ideally suited for base metals, non-metallics, coal - wherever HMS is applicable. Available in numerous sizes to fit any operation, meet any condition. Capacities from 5-420 TPH depending on type of material treated, size of mate rial and nature of separation. Uses magnetite and/or ferrosilicon. Option of drum, double drum or cone separator.



FAGERGREN FLOTATION MACHINE

For selective, bulk or skin flotation in milling and beneficiation of metallic and non-metallic ores, iron, coals, sands and other industrial materials. Cell sizes 18"x18" to 66"x66" in single or multiple units. Long-life wearing parts of pressure-molded rubber or abrasion resistant alloy iron. Proven superiority of rotorstator principle permits improved flotation metallurgy at low cost.



WEMCO SAND PUMP

For handling pulps of coarse, gritty solids, slimes, slurries or heavy density media. Heavy duty construction and oversize bearings allow continuous operation under the severest conditions. Discharge diameters: 11/4", 11/2", 2", 3", 4", 5", 6", 8" and 10".



WEMCO ATTRITION MACHINE

For removal of coatings or slimes from particle surfaces either to increase the effectiveness of subsequent processing, upgrade the final product or recover surface coating materials. Internal parts are rubber covered for protection from abrasion.



STEFFENSEN FLOTATION MACHINE

A simple free air type flotation machine which uses an external source of low pressure air and has no moving parts. Highly efficient air dispersion principle produces large numbers of small bubbles. Particularly suitable for handling coarse flotation pulps having a high per-centage of solids. Usually installed in series of two to six cells with feed passing from cell to cell until optimum flotation conditions are obtained. Available in two sizes, #20 and #60.

OTHER WEMCO PRODUCTS:

AGITATORS CONDITIONERS COAL SPIRALS

HMS DENSIFIERS **HYDROSEPARATORS** DIAPHRAGM PUMPS **HMS THICKENERS DEWATERING SPIRALS** STANDARD THICKENERS

HMS LABORATORY UNITS FLOTATION LABORATORY UNITS SAND PREPARATION MACHINES

WRITE FOR CATALOGS AND COMPLETE OPERATIONAL DATA

PRINCIPAL OFFICES

San Francisco * Sacramento * Salt Lake City Spokane * Denver * Phoenix * Chicago Hibbing, Minnesota * New York * Birmingham Toronto, Canada * Jeffersonville, Indiana

EXPORT DISTRIBUTORS
Fraser & Chalmers (S.A.) (Pty.) Limited
P.O. Box 619, Johannesburg, South Africa

Lilestone & Co., Inc. P.O. Box 3368, Manila, Philippines United Development Corporation Pty. Ltd. P.O. Box 3460, Sydney, N.S.W., Australia Corporation Commercial Sudamericana S.A. Casilla 505 Lima, Peru The Sumitomo Machinery Co., Ltd. 5-22 Kitahama, Higashi-Ku, Osaka, Japan



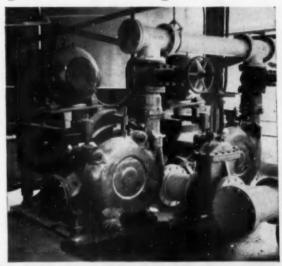
from Primary Slurry to Tailings

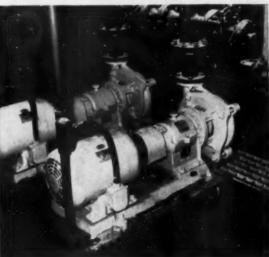
In this new southern phosphate plant, dependable WILFLEY pumps handle difficult pumping jobs efficiently and economically. Materials handled include acid, hot acid sludge and phosphate tailings. Wherever installed, these famous pumps—both Acid and Sand—consistently increase production and create substantial dollar savings in power and maintenance.

"COMPANIONS IN ECONOMICAL OPERATION"
Wiffley Sand Pump

- · Cost-saving efficiency
- Stepped-up production
- Continuous operation without attention
- Minimum replacement of parts
- Designed for simple installation
- Economical pump size for every requirement

Individual engineering on every application. Write, wire, or phone for complete details.





A. R. WILFLEY & SONS, INC.